Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	003 A3.04	
	Importance Rating	3.6	3.6

Ability to monitor automatic operation of the RCPs, including: RCS flow.

Proposed Question: Common 1

Given the following conditions:

- o The plant is in Hot Standby.
- o RCS temperature is 365°F.
- o RCS heatup is in progress.

Which ONE (1) of the following describes the response of indicated RCP flow as the RCS heatup continues?

Indicated flow…

A. INCREASES as coolant density INCREASES

B. DECREASES as coolant density INCREASES

C. INCREASES as coolant density DECREASES

D. DECREASES as coolant density DECREASES

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Density will decrease as RCS heatup continues
B. Incorrect. Indicated flow will decrease as density decreases (DP decreases)
C. Incorrect. Opposite of actual effect of density decrease
D. Correct.

Technical Reference(s): LP FLO-3 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: FLO 3 Obj 3.1.1 (As available)

Question Source: Bank # ______
Modified Bank # ______ (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge ______
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

IP3
C1

c. It compares static and dynamic pressures. The difference can only be due to velocity.

d. Principles of operation:

(1) On the inlet, only static pressure is felt.

(2) However, the total pressure of the fluid is felt at point 2.

(3) All KE of the fluid is converted to flow energy, yielding a higher pressure at point 2.

(4) Again,

$$\dot{V} = K\sqrt{\Delta P}$$

FLO-XP-3.7

E.O. 3.1.1.e

5. Pipe Elbow

a. As fluid is turned by the piping, dynamic forces impinge on the outer bend.

b. This creates a pressure difference between the inner and outer circumferences of the elbow.

c. Example: Reactor Coolant System Flow Detection.

E.O. 3.1.2

6. Density compensation

a. So far, our assumption has been that we are dealing with a constant density fluid.

b. When a compressible fluid (gas) passes through a restriction, velocity increases, pressure decreases, density decreases, velocity must increase further.

c. Flowmeters measure the static pressure upstream and the differential pressure between the two taps.

d. Expansion factor Y is used to account for the changes in flow area and fluid pressure.

$$\dot{M} = K\,A_2 Y\sqrt{\rho\Delta P}$$

e. Flow detectors are calibrated to be accurate assuming the fluid they measure is of some known density.

f. If its density changes, the flow detector must have

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	1	1
K/A #	003 K4.04	
Importance Rating	2.8	3.1

Knowledge of RCPS design feature(s) and/or interlocks(s) which provide for the following: Adequate cooling of RCP motor and seals.

Proposed Question: Common 2

The plant is operating at 100% power.

RCP Thermal Barrier Return Isolation valve AC-FCV-625 has inadvertently failed closed.

Which ONE (1) of the following describes the effect on RCP seal cooling, if any, as a result of this failure?

A. CCW will flow to the RCP Thermal Barrier Heat Exchangers and discharge through a relief valve inside containment, providing adequate cooling flow.

B. RCP seal cooling is being provided by a charging pump via seal injection.

C. RCP seal cooling is lost and the RCPs must be tripped within 2 minutes to prevent damage to the Thermal Barrier Heat Exchanger and motor bearings.

D. RCP seal cooling is unaffected by the valve failure. The cooling water flow paths are uninterrupted.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Even if a relief lifted, it would not provide cooling water flow adequate to cool seals

B. Correct.

C. Incorrect. Cooling is not lost. Action is for loss of CCW

D. Incorrect. TBHX CCW is lost, but seal injection is not

Technical Reference(s): SD 1.3 (Attach if not previously provided)

LP NSS-03

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1014 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

JR3 CV

1.0 INTRODUCTION

1.1 Purpose and General Description (Figure 1.3-01)

The Reactor Coolant Pumps (RCPs) circulate reactor coolant through the reactor core to the Steam Generators where the heat produced by nuclear fission is transferred from the RCS to the water in the secondary side of the Steam Generator. The SG water is converted to steam and is used to rotate the Main Turbine Generator (MTG) to produce electricity.

The RCPs are Westinghouse Model No. 93 supplied with a 6000 HP motor. They are designed to pump 88,500 gpm each at a head of 272 ft at rated RCS conditions of 555°F and 2235 psig.

The RCPs are vertical, single-stage, centrifugal, controlled leakage pumps which can be divided into three components: the pump, the shaft sealing package and the motor.

The pump consists of a casing, impeller, diffuser, thermal barrier, lower radial bearing, pump shaft and pump flange.

Within the casing are located the impeller and diffuser. The impeller draws coolant axially up through the bottom of the casing and directs it radially into the diffuser. The diffuser is a series of stationary vanes with an expanding cross-sectional area where the fluid's kinetic energy is converted into pressure energy. The fluid then enters the discharge bowl of the casing and exits the pump via the discharge nozzle.

Above the impeller is the thermal barrier containing a heat exchanger and labyrinth seals. Reactor coolant will flow up the shaft and through the thermal barrier during a loss of seal injection flow. The thermal barrier cools and restricts reactor coolant flow to protect both the pump lower radial bearing and the shaft seal package which are not designed to withstand normal reactor coolant temperatures. The cooling medium for the thermal barrier heat exchanger is Component Cooling water.

High pressure seal injection water from the charging pumps is admitted above the thermal barrier where the flow (approximately 8 gpm) splits: ≈5 gpm flows down past the thermal barrier into the RCS and the remaining ≈3 gpm flows up to cool and lubricate the pump's lower radial bearing and shaft seal package. Our actual #1 seal leakoff flow rates have historically been between 1 gpm and 2 gpm which is

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	004 K6.17	
	Importance Rating	4.4	4.6

Knowledge of the effect of a loss or malfunction of the following will have on the CVCS: Flow paths for emergency boration.

Proposed Question: Common 3

Given the following conditions:

- An ATWS has occurred.
- The team is aligning CVCS for emergency boration.

If the Boric Acid Transfer Pumps tripped and could NOT be restarted, which ONE (1) of the following describes the Charging pump suction flowpath(s) that is (are) unavailable?

A. LCV-112B, RWST to Charging Pump suction

B. LCV-112C, VCT Outlet to Charging Pump suction

C. MOV-333, Boric Acid to Charging Pump suction

D. The flow paths from both MOV-333 and LCV-112B

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Alternate flowpath
B. Incorrect. Isolated path if alternate chosen
C. Correct.
D. Incorrect. LCV-112B is available

PSA-01

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1137, 1139 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

FP3
3

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>INITIATE Emergency Boration Of RCS:</u>	
	a. CHECK charging pumps - ANY RUNNING	a. PERFORM the following: 1) START one charging pump in manual at maximum speed. 2) <u>IF</u> Component Cooling Water for charging pump cooling is unavailable, <u>THEN</u> DISPATCH NPO to align City Water Back-up supply to charging pumps per SOP-ESP-1.
	b. OPEN CH-MOV-333, Emergency Boration valve	b. Emergency BORATE using one of the following methods in order of preference: • ATTACHMENT 1, EMERGENCY BORATION USING NORMAL BORATION, Page 21. <u>OR</u> • ATTACHMENT 2, EMERGENCY BORATION USING RWST, Page 22. <u>OR</u> • ATTACHMENT 3, EMERGENCY BORATION BY FAILING AIR TO FCV-110A, Page 23.

(STEP 4 CONTINUED ON NEXT PAGE)

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

(Step 4 continued from previous page)

c. CLOSE BAST recirc control valves:

- HCV-104
- HCV-105

d. START both boric acid transfer pumps in high speed

e. TRANSFER operating charging pump to manual control and INCREASE speed to maximum

f. CHECK PRZR pressure - LESS THAN 2335 PSIG

RESPONSE NOT OBTAINED:

f. PERFORM the following:

1) VERIFY PRZR PORVs and block valves are open.

2) IF NOT, THEN OPEN PRZR PORVs and block valves until PRZR pressure less than 2135 psig.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	013 A1.01	
	Importance Rating	4.0	4.2

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating ESFAS controls including: RCS Pressure and Temperature

Proposed Question: Common 4

Given the following:

- A LOCA has occurred
- RCS pressure is currently 1000 psig
- All Recirculation capability has been lost

Which ONE (1) of the following describes the strategy for maintaining RCS heat removal while performing ECA-1.1, Loss Of Emergency Coolant Recirculation?

A. Maintain RCS temperature and pressure stable; reduce SI flow to minimum using one SI and one RHR pump for RCS decay heat removal.

B. Maintain RCS temperature and pressure stable; reduce SI flow to minimum using only one SI pump for RCS decay heat removal with both RHR pumps secured or one RHR pump aligned to RCS.

C. Initiate a plant cooldown; reduce SI flow to minimum using only one RHR pump for RCS decay heat removal and one Charging pump aligned for RCS makeup.

D. Initiate a plant cooldown; reduce SI flow to minimum using only one SI pump for RCS decay heat removal with both RHR pumps secured or one RHR pump aligned to RCS.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Initiate cooldown

B. Incorrect. Initiate cooldown

C. Incorrect. Do not use RHR

D. Correct

Technical Reference(s): ECA-1.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5603, 5604 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

FR3-4

Number:	Title:	Revision Number:
ECA-1.1	LOSS OF EMERGENCY COOLANT RECIRCULATION	13

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

Shutdown margin should be monitored during RCS cooldown. Refer to Graph RCS-4A, 4B.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>INITIATE RCS Cooldown To Cold Shutdown:</u>	
	a. VERIFY all control rods - LESS THAN 20 STEPS	a. <u>IF</u> two <u>OR</u> more control rods are withdrawn more than 20 STEPS, <u>THEN</u> CONSULT TSC Reactor Engineering for SDM reqirements.
	b. MAINTAIN cooldown rate in RCS cold legs - LESS THAN 100°F/HR	
	c. DUMP steam to condenser from intact SG(s)	c. PERFORM the following: 1) Manually OPEN intact SG(s) atmospherics. 2) <u>IF</u> unable to open atmospheric(s), <u>THEN</u> DISPATCH NPO to open intact SG(s) atmospherics per SOP-ESP-1. 3) <u>IF</u> desired to increase steam loads, <u>THEN</u> USE turbine-driven AFW pump. 4) <u>IF</u> NO intact SG is available, <u>THEN</u> USE faulted SG.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

(Step 10 continued from previous page)

	e. CHECK RHR pumps - ONLY ONE RUNNING LINED UP TO RCS	e. PERFORM the following: 1) ENSURE 882 is open 2) ENSURE 743 and 1870 are open 3) START or STOP RHR pump(s) to establish only one running and aligned to the RCS.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
13.	* **<u>DETERMINE If SI Can Be Terminated:</u>** *	
	a. CHECK RVLIS indication - GREATER THAN REQUIRED BY TABLE:	a. GO To Step 18, Page 18.

NO. OF RCPs RUNNING	RVLIS DYNAMIC RANGE	RVLIS FULL RANGE
0	—	61%
1	25%	—

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	b. CHECK RCS subcooling based on qualified core exit TCs - GREATER THAN 90°F [SEE ATTACHMENT 1, MINIMUM INDICATION TO ASSURE SUBCOOLING PLUS 10 F [ADVERSE], "**MINIMUM SUBCOOLING PLUS 50°F**" column]	b. ESTABLISH minimum SI flow to remove decay heat as follows: 1) DETERMINE <u>minimum</u> SI flow required from ATTACHMENT 2, MINIMUM SI FLOW RATE VERSUS TIME AFTER TRIP, Page 36. 2) DETERMINE TOTAL flow rates using all of the following as applicable: • Total HHSI pump flows • Total RHR pump flows • Charging flow

(STEP 13 CONTINUED ON NEXT PAGE)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	015 K5.02	
	Importance Rating	2.7	2.9

Knowledge of the operational implications of the following concepts as they apply to the NIS: Discriminator/compensation operation.

Proposed Question: Common 5

Which ONE (1) of the following contains BOTH conditions that will result in indicated reactor power being LOWER than actual reactor power?

A. Source Range pulse height discrimination set too LOW
Intermediate Range Compensating voltage set too LOW

B. Source Range pulse height discrimination set too HIGH
Intermediate Range Compensating voltage set too HIGH

C. Source Range pulse height discrimination set too LOW
Intermediate Range Compensating voltage set too HIGH

D. Source Range pulse height discrimination set too HIGH
Intermediate Range Compensating voltage set too LOW

Proposed Answer: B

Explanation (Optional):

A. Incorrect. If pulse height discrimination is set too low, then more gamma pulses will be counted, resulting in an indicated reading higher than actual. If IR compensating voltage is set too low, the detector will have a higher output, resulting in a higher power indication
B. Correct.
C. Incorrect. See explanation for 'A' above
D. Incorrect. See explanation for 'A' above

Technical Reference(s): SD-13 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0808 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis Comp

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	017 A4.01	
	Importance Rating	3.8	4.1

Ability to manually operate and/or monitor in the Control Room: Actual in-core temperatures.

Proposed Question: Common 6

The team is performing EOP-FR-C.1, Response to Inadequate Core Cooling.

Both channels of Reactor Vessel Level Indication System (RVLIS) are INOPERABLE.

Preparations are being made to start RCPs.

Which ONE (1) of the following indications provides the status of RCS inventory under these conditions?

A. Pressurizer Level

B. Safety Injection flow

C. Core Exit Thermocouples

D. Core Delta Temperature (Thot – Tcold)

Proposed Answer: C

Explanation (Optional):

A. Incorrect. During inadequate core cooling events, there will most likely be no pressurizer level indication, and even if there is, it's probably because water was displaced from the outlet plenum. Therefore, in FR-C.1, pressurizer level is not used as an indicator.

B. Incorrect. SI flow can be an indicator of core cooling capability, but not an actual inventory indication. And in this case, since the crew is preparing to start RCPs, SI has not been restored yet.

C. Correct.

D. Incorrect. Core Delta T gives a reliable indication of natural circulation heat removal during subcooled conditions, but for the conditions given, can be any value due to loop stagnation and loss of reflux, most likely a low Delta T since core cooling has been lost. FR-C.1 uses RVLIS and CET's

Technical Reference(s): FR-C.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5636 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

C6

Number:	Title:	Revision Number:
FR-C.1	RESPONSE TO INADEQUATE CORE COOLING	14

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	<u>CHECK RVLIS Full Range Indication:</u>	
	a. CHECK RCPs - NONE RUNNING	a. RETURN To Procedure and Step in effect.
	b. CHECK indication - GREATER THAN 33%	b. PERFORM the following: 1) <u>IF</u> increasing, <u>THEN</u> RETURN To Step 1, Page 2. 2) <u>IF NOT</u>, <u>THEN</u> GO To Step 7.
	c. RETURN To Procedure and Step in effect	
7.	<u>CHECK Core Exit TCs:</u>	
	a. CHECK temperature - LESS THAN 715°F	a. PERFORM the following: 1) <u>IF</u> decreasing, <u>THEN</u> RETURN To Step 1, Page 2. 2) <u>IF NOT</u>, <u>THEN</u> GO To Step 8.
	b. RETURN To Procedure and Step in effect	

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	1	1
K/A #	022 A4.04	
Importance Rating	3.1	3.2

Ability to manually operate and/or monitor in the Control Room: Valves in the CCS.

Proposed Question: Common 7

Given the following conditions:

- The plant is operating at 100% power.
- 31, 32, 33, and 35 FCUs are in service to provide Containment Cooling.
- All Emergency Safeguards Features equipment is operable

Subsequently, reactor trip and safety injection actuate. All safeguards equipment functions as designed.

Which ONE (1) of the following describes the resulting Containment Cooling lineup?

A. Only 31, 33, and 35 FCUs will be in service. Cooling water flow is raised by TCV-1103 failing to the open position.

B. Only 31, 33, and 35 FCUs will be in service. Cooling water flow is raised by providing a Service Water flow path parallel to TCV-1103.

C. All FCUs will be in service. Cooling water flow is raised by TCV-1103 failing to the open position.

D. All FCUs will be in service. Cooling water flow is raised by providing a Service Water flow path parallel to TCV-1103.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. All will start on SI and TCV-1104 and 1105 provide bypass for TCV-1103

B. Incorrect. All FCUs in service

C. Incorrect. Parallel flow path

D. Correct.

Technical Reference(s): ESS-04 LP (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0479 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

c1

b. All fans automatically start on an SI signal. E.O.4

(1) During accident conditions fan capacity decreases to 34,000 cfm due to a change in damper alignment.

c. Each unit has 4 dampers and a blow-in door. TP-4 E.O.2.b

(1) All dampers and the blow-in door are operated remotely by the use of cylinders operated by instrument air, controlled by solenoid valves. E.O.1.c

(2) The dampers and blow-in door fail to their safeguards position on:

(a) Loss of instrument air.
(b) Loss of power to the solenoid.
(c) An SI signal. E.O.4

(3) Dampers A and B are the normal inlets. They are normally open, but close on a SI signal. They operate together off the same control switch. Total flow through A/B dampers is ≈54,200 cfm E.O.4

(4) Damper C is normally open.

(a) During normal operation it passes a maximum of 15,800 cfm.

(b) It goes to a pre-set position on an SI signal. E.O.4

(c) In its preset position, Damper C passes a maximum of 26,000 cfm.

(d) This allows 8000 cfm through the filters.

(5) Damper D works in conjunction with the blow-in door.

(a) Normally, both are closed to isolate the filter section.

(b) They both open on a SI signal to allow flow through the filter section. E.O.4

(6) The blow-in door also functions to relieve pressure into the filtration unit when the containment building pressure increases during an accident.

(a) This prevents collapse of the filtration unit.

(b) The blow-in door opens with an external pressure of .5 psi.

(c) The blow-in door is capable of passing 8000 cfm through the filter unit.

d. Each unit has cooling coils supplied by service water. TP-4 E.O.1.a

(1) The coils are four pass flow, eight tubes deep by 24 tubes high.

(2) Stainless steel tubes with copper fins.

(3) Each FCU has two banks of four cooling coils arranged in series with air flow.

(4) The cooling water flow is normally regulated by TCV-1103 to maintain containment temperature. TP-5 Located in pipe chase by mini containment

(5) On SI actuation TCV-1103 is automatically bypassed to allow maximum service water flow to the cooling coils. E.O.4

(6) During accident conditions service water to the cooling coils is greater than 1400 gpm per FCU through TCV-1104 and TCV-1105.

e. Each unit has a filtration section. E.O.2.a

(1) The filtration section is normally isolated and is automatically placed in service during accident conditions.

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	1	1
K/A #	059 K4.19	
Importance Rating	3.2	3.4

Knowledge of MFW design feature(s) and/or interlock(s) which provide for the following: Automatic feedwater isolation of MFW.

Proposed Question: Common 8

The following plant conditions exist:

- Unit 3 reactor power - 82%
- 32 Main Feedwater Regulating valve is failing open and cannot be closed
- 32 SG level indicates 76% and rising
- 31, 33, 34 SG levels are 35% and dropping

Which of the following describes ALL the correct actions that will occur?

A. 32 main feedwater regulating valve will trip closed. Reactor will trip on LO-LO SG level.

B. MBFP discharge isolation valves close, both feedwater pumps trip, feedwater regulating valves close, and the turbine will trip causing a reactor trip.

C. MBFP discharge isolation valves close, both feedwater pumps trip, AMSAC actuates, and the turbine will trip causing a reactor trip.

D. Both feedwater pumps trip, feedwater regulating valves close, and AMSAC will trip the turbine causing a reactor trip.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Trip is due to High SG level
B. Correct.
C. Incorrect. No AMSAC actuation
D. Incorrect. No AMSAC actuation

Technical Reference(s): SPC -05 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1547 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

FP3 C8

6. Feedwater Isolation Signals (FWIS) — E.O.5.b; Students pull logics

a. A Hi-Hi level in any SG (75%) will: — Dwg 5651D72 sh 13

(1) Close that SGs main and bypass FRV's

(2) Close both MBFPs discharge isolation valves and trip both MBFPs — E.O.2.c

(3) Trip the main turbine

b. A Reactor Trip coincident with Tave <554°F will close all 4 SGs main and bypass FRV's — Dwg 5651D72 sh 13

c. An SI signal will:

(1) Close all 4 main and bypass FRV's — Sheet 12A □ 13

(2) Close both MBFPs discharge isolation valves and trip both MBFPs — E.O.2.c; E.O.2.g

(3) Close FRV and Low Flow Bypass FRV MOV's (R11 modification DCP 00-3-005-FW)

(4) MCC-311 does not strip on SI to allow MOV closure during SI (R11 modification DCP 00-3-005-FW)

7. Key operated FW Isolation Defeat Switches are on Control Room panels G-4 and G-6 - Defeat SI and Rx trip/Low Tavg signals — E.O.5.c

a. Allows operation of Main and Low Flow FRV's after an SI as called for during EOP FR-H.1 (Response to Loss of Secondary Heat Sink)

b. Both switches must be activated to feed SGs

c. Alarms in Control Room when switches operated

E. System Operation

1. SOP-FW-3 (Filling, Venting and Cleanup of the Feedwater and Condensate Systems) — E.O.7.a

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	059 A4.03	
	Importance Rating	2.9	2.9

Ability to manually operate and monitor in the Control Room: Feedwater control during power increase and decrease.

Proposed Question: Common 9

Given the following conditions:

- The plant is at 100% power.
- A load reduction to 70% is planned.

Which ONE (1) of the following describes the preferred method of feedwater control during the load change?

A. MBFP speed control in manual. Ensure the feedwater regulating valve controllers automatically stay “nulled” during the load change.

B. MBFP speed control in manual. Manually “null” the feedwater regulating valve controllers during the load change.

C. MBFP speed control in automatic. Ensure the feedwater regulating valve controllers automatically stay “nulled” during the load change.

D. MBFP speed control in automatic. Manually “null” the feedwater regulating valve controllers during the load change.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. MBFPs operated in automatic if possible
B. Incorrect. MBFPs operated in automatic if possible
C. Incorrect. Null operation performed manually
D. Correct.

Technical Reference(s): POP-2.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1547 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

ATTACHMENT 2
REACTOR POWER ASCENSION CHECKLIST

CRS

NOTE

WHEN greater than 45% Reactor power, THEN any of Steps 7.0 through 14.0 that are inappropriate may be N/A.

2.0 IF Reactor power is greater than 45%, N/A, Initial, and date in appropriate steps. ________

3.0 OBTAIN Shift Manager permission to increase Reactor power and continue performance of this Attachment:

______________________ Date ________Time _________
SM Signature

4.0 NOTIFY Entergy System Operator of load increase. ________

5.0 COMMENCE/ CONTINUE performance of 3PT-V053A, Power Ascension Surveillance Requirements. ________

6.0 Prior to exceeding 50% reactor power, POSITION control rods for power ascension per Graph RV-12 OR as recommended by the Reactor Engineer. ________

7.0 INITIATE Reactor power increase to 100 %.

7.1 ADJUST FW Regulator(s) manual setpoint to null manual-auto deviation:

- MAINTAIN FW Regulators nulled while continuing with this Attachment. ________

7.2 ADJUST Control Rod position per:

- Graph RV-13, D Bank Position to Maintain HFP Target Flux Difference

-OR-

- Reactor Engineer guidance. ________

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	061 K6.02	
	Importance Rating	2.6	2.7

Knowledge of the effect of a loss or malfunction of the following will have on the AFW components: Pumps.

Proposed Question: Common 10

Given the following conditions:

- Reactor trip from 100% power
- All systems function as designed
- 480 Bus 3A is de-energized due to a fault.

Assuming no action taken by the team, which ONE (1) of the following describes the Steam Generators that have AFW flow?

A. All four SGs

B. 31 and 32 SGs

C. 33 and 34 SGs

D. None of the SGs are currently supplied with AFW

Proposed Answer: C

Explanation (Optional):

A. Incorrect. TDAFW does not start. 31 MDABFP is de-energized due to bus fault
B. Incorrect. 31 ABFP supplies 31 and 32 SGs
C. Correct.
D. Incorrect. 33 and 34 have available flow from 33 ABFP

Technical Reference(s): SPC-L0907 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 4170 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

RP3
C10

a. Two electric motor driven pumps are installed which feed two of the four steam generators each.

(1) 31 Aux Boiler Feed pump feeds 31 and 32 steam generators

(2) 33 Aux. Boiler Feed pump feeds 33 and 34 steam generators.

(3) Both electric feed pumps have independent recirc lines back to the CST that open on a low AFWP suction flow

b. 32 Aux. Boiler Feed pump is a steam turbine driven feed pump.

(1) It is supplied by steam from 32 and/or 33 steam generator.

(2) It can supply all four steam generators

(3) 32 Aux Boiler Feed pump is a backup pump to the electric feed pumps.

(4) Constant recirc back to the CST.

c. Recirc lines protect the pumps from overheating at low flow/near dead-head conditions — E.O.3.c

3. Aux. Boiler Feed Discharge flow path.

a. The discharge of the motor driven feed pumps splits to two flow paths (one for each generator) after a discharge check valve.

(1) Each flow path has an isolable pneumatic regulating valve to control feed flow and a non-return check valve.

(2) Each flow path combines with the discharge line from 32 Aux. Boiler Feed pump

(3) The flow paths then tie into the normal feed line to the steam generator down stream of their manual isolation valves — E.O.1.a Near BFD-7's

183
C10

(4) CT-64 is a manual gate valve

(a) Dual red lights on SCF

(5) Both CT-6 and CT-64 are locked open valves and are on the Locked Valve COL

(6) If either CT-6 or 64 are not fully open an alarm sounds in CR on panel SKF (Each valve has its own alarm)

2. Motor Driven Aux Boiler Feed Pumps — E.O.2.a

a. Two Identical Aux. Boiler Feed Pumps

(1) 480V Bus 3A feeds 31 pump, 6A feeds 33 — E.O.4.a

(2) Pumps are 9 stage centrifugal pumps rated at 400 gpm, 3120 feet of water (1352.6 psig) — TP-9.3 AFW-03

(3) They will supply ~370 to 380 gpm at normal S/G pressure.

(4) The pump will run out at about 800 gpm (750 psig discharge pressure)

b. Pumps have roller bearing with a slip ring oiler

(1) Bearing cooling provided by pump suction tap off.

(2) Oil is circulated to the bearing by slip rings.

(3) An inspection port is provided to view the slip rings

(4) Over filling the oil sump or failure of the slip ring to turn will cause the bearing to over heat.

(a) Oil level marked on pump casing

(b) The slip ring can be jogged to return it to motion.

(5) Are environmentally qualified to operate in steam environment

c. Motor Driven Pump Control — E.O.2.d,

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	1	1
K/A #	071 K5.04	
Importance Rating	2.5	3.1

Knowledge of the operational implication of the following concepts as they apply to the Waste Gas Disposal System: Relationship of hydrogen/oxygen concentrations to flammability.

Proposed Question: Common 11

Per TRM 3.7.D, Explosive Gas Monitoring System, which ONE of the following limits prevents a flammable mixture in the Waste Gas System?

A. Oxygen concentration is always maintained ≤ 2%.

B. Hydrogen concentration is always maintained ≤ 2%.

C. Oxygen concentration is maintained ≤ 2% when Hydrogen concentration is ≥4%.

D. Hydrogen concentration is maintained ≤2% when Oxygen concentration is ≥4%.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Only required when H2 is >4%
B. Incorrect. May be higher depending on plant evolution
C. Correct.
D. Incorrect. Opposite of actual requirement

Technical Reference(s): Tech Requirements 3.7.D (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 2272.b (As available)

Question Source: Bank # ______
Modified Bank # X (Note changes or attach parent)
New ______

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ______

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

IP3 C11

3.7 PLANT SYSTEMS

3.7.D Explosive Gas Monitoring System

TRO 3.7.D The concentration of oxygen in the waste gas holdup system shall be limited to less than or equal to 2% by volume whenever the hydrogen concentration exceeds 4% by volume.

APPLICABILITY: AT ALL TIMES

------------------------------------NOTES------------------------------------
1. Refer to TRO 3.3.H for instrumentation requirements.
2. TRO 3.0.C is not applicable.
3. Refer to Technical Specifications 5.5.11 for program requirements.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Oxygen concentration in the waste gas holdup system is greater than 2% by volume, <u>AND</u> Oxygen concentration in the waste gas holdup system less than or equal to 4% by volume, <u>AND</u> Hydrogen concentration in the waste gas holdup system is greater than 4% by volume.	A.1 Reduce oxygen concentration in the waste gas holdup system to less than or equal to 2% by volume.	48 hours
B. Required Action and associated Completion Time of Condition A not met.	B.1 Stop all additions of waste gases to this portion of the system, <u>AND</u> B.2 Reduce oxygen concentration in the waste gas holdup system to less than or equal to 2% by volume.	Immediately Immediately
C. Oxygen concentration in the waste gas holdup system is greater than 4% by volume, <u>AND</u> Hydrogen concentration in the waste gas holdup system is greater than 2% by volume.	C.1 Stop all additions of waste gases to this portion of the system, <u>AND</u> C.2 Reduce oxygen concentration in the waste gas holdup system to less than or equal to 2% by volume.	Immediately Immediately

(continued)

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	1	1
K/A #	072 A3.01	
Importance Rating	2.9	3.1

Ability to monitor automatic operation of the ARM system, including: Changes in ventilation alignment.

Proposed Question: Common 12

Describe the automatic actions taken as a result of R-1, Control Room Area Radiation monitor, reaching an alarm condition.

A. A high radiation alarm actuates with no auto actions.

B. The control room A/C switches to 10% Incident mode.

C. The control room ventilation shifts to 100% Incident mode.

D. The control room A/C secures and the vents shut.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Radiation alarm causes the ventilation alignment
B. Correct.
C. Incorrect. Safeguards actuation causes 100% incident
D. Incorrect. AC stays on, vents realign

Technical Reference(s): ONOP-RM-2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5043 (As available)

Question Source: Bank # X
Modified Bank # ____ (Note changes or attach parent)
New ____

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ____

10 CFR Part 55 Content: 55.41 X
55.43 ____

Comments:

ATTACHMENT 1
RADIATION MONITOR
AUTOMATIC ACTIONS

Monitor Number	Description	Automatic Action

R-1	R1 CCR AREA	• CCR Ventilation will swap to the "10% Incident" Mode
		  • Damper A closes
		  • Damper B opens
		  • Damper C is throttled.
		  • Toilet & Locker Room fan stops
		  • One booster fan inlet damper opens and the associated booster fan starts
		• IF the CCR ventilation has swapped to the "10% incident" mode AND "Damper A" has failed to close THEN close the manual damper upstream of damper "A & B" AND select the "100% incident" mode.

R-5	FSB AREA	1. The FSB supply fans stop and their outlet dampers close 2. The exhaust fan starts. 3. The inlet and outlet dampers to the charcoal filter open 4. Station air inflates the door seals. 5. The rolling door closes
R-11 R-12	Containment Air Particulate and/or Radiogas Monitor	**ALERT:** 1. Containment Evacuation alarm **HIGH ALARM:** 1. Purge supply and exhaust valves close 2. Containment pressure relief valves close
R-14	Plant Vent Radiogas Monitor	1. Closes WD-RCV-014 2. Initiates Containment Vent Isolation 3. PAB exhaust will be diverted through the charcoal filters

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	006 K2.02	
	Importance Rating	2.5	2.9

Knowledge of bus power supplies to the following: Valve operators for accumulators.

Proposed Question: Common 13

Which ONE (1) of the following MCCs provides electrical power to a Safety Injection Accumulator Isolation valve?

A. MCC-31

B. MCC-37

C. MCC-36A

D. MCC-38

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Not safety related
B. Incorrect. Not safety related
C. Correct. 33 SI accumulator
D. Incorrect. In containment but not safety related

Technical Reference(s): COL EL-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0193 (As available)

Question Source: Bank # ______

Modified Bank # ______ (Note changes or attach parent)

New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis ______

10 CFR Part 55 Content: 55.41 X

55.43 ______

Comments:

IP3 C13

1) (CONTINUED)

	Des. Oper. Pos.	Actual Pos.	Init.
SI-MOV-1802A Recirc Pumps Discharge Isolation	On		
SI-MOV-885A Containment Sump RHR Suction Isolation	On		
SI-MOV-894A 31 Accumulator Discharge Isolation	Locked Off		
SI-MOV-851A 32 Safety Injection Pump Discharge Non BIT Header Isolation	On		
SI-MOV-888A Low Head to High Head SI Recirc Isolation	On		
SI-MOV-889A 32 RHR Heat Exchanger Outlet To Spray Header Isolation	On		
SI-MOV-880G 34 FCU Charcoal Filter Dousing Isolation	On		
SI-MOV-880J 35 FCU Charcoal Filter Dousing Isolation	On		
31 Auxiliary Component Cooling Water Pump	On		
Sump Pump 32	On		
Boric Acid Heat Tracing Transformer Normal Feed	On		
SI-MOV-747 31 RHR Hx Outlet Injection Isolation	On		
32 Auxiliary Component Cooling Water Pump	On		
31 Boric Acid Transfer Pump	On		
AC-MOV-743 RHR Pumps Miniflow Isolation	Locked Off		
BFD-MOV-2-31 31 Main Boiler Feed Pump Discharge Isolation	On		
SI-MOV-856E Loop 31 Cold Leg High Head Injection Line BIT Header Isolation	On		
SI-HCV-640 32 RHR Hx Outlet Flow Control Valve	On		
Spare	Off		
33 Control Building Exhaust Fan	On		
Spare	Off		
Spare	Off		
Spare	Off		
Spare	Off		
Spare	Off		
Spare	Off		

COL-EL-1

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	010 A3.02	
	Importance Rating	3.6	3.5

Ability to monitor automatic operation of PZR PCS, including: PZR pressure.

Proposed Question: Common 14

Given the following conditions:

- The plant is at 93% power after a short transient.
- All control systems are operating in their normal alignments
- Pressurizer PORVs indicate closed
- Pressurizer Spray valves indicate closed
- Modulating Heaters are energized at maximum output
- One set of backup heaters is on in manual
- All other Backup Heaters are off with control switches in AUTO

Based on the conditions presented, which ONE (1) of the following is the current value of Pressurizer pressure?

A. 2180 psig

B. 2210 psig

C. 2250 psig

D. 2260 psig

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Backup heaters would be on

B. Correct

C. Incorrect. Modulating would only be at half voltage

D. Incorrect. Spray would be opening and modulating heaters would not be at full voltage

Technical Reference(s): IXC-L1106 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0906 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

JP3
c14

group

iii) In auto breakers for backup groups and SCR's for mod. group controlled by pressure control circuitry

(e) Two of the three banks of B/U groups are energized and deenergized together

i) Auto on when pressure falls to 2185 psig (reset 2200 psig)

ii) 2185 psig actuation and 2200 psig reset tied to master controller as -50 and -35 psig from P_{ref}

iii) Auto on when PRZR level rises 5% above reference setpoint. This is in anticipation of a pressure drop following an insurge of cooler water. EO-4c

(f) One of the B/U groups is left on so normally the PZR spray valves are open controlling pressure. Ensures more thorough mixing of PZR NSE-96-3-083

(i) With this arrangement the pressurizer pressure controller may experience a phenomena called Reset Windup

(ii) Controller percent output is a function of current output not pressure.

(iii) This controller feature along with the proportional integral controller function results in a phenomena called Reset Windup

(iv) "RESET WINDUP" occurs when there is an error between process and setpoint for an extended period of

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	2	2
K/A #	011 K2.02	
Importance Rating	3.1	3.2

Knowledge of bus power supplies to the following: PZR heaters.

Proposed Question: Common 15

Which ONE (1) of the following 480 volt busses supplies the electrical power for the pressurizer modulating heaters?

A. 2A

B. 3A

C. 5A

D. 6A

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Backup heaters
B. Incorrect. Backup heaters
C. Incorrect. Backup heaters
D. Correct.

Technical Reference(s): IXC-L1106 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0907.a (As available)

Question Source: Bank # ____________

Modified Bank # ____________ (Note changes or attach parent)

New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis ____________

10 CFR Part 55 Content: 55.41 X

55.43 ____________

Comments:

II. PRESENTATION

A. Purpose

1. Maintain system pressure

2. Limit pressure changes during transients

3. Prevent RCS from exceeding design pressure

B. Detailed Description

1. System controls heaters, spray, and PRZR PORV's

a. Immersion Heaters — EO-2a,b

(1) Immersion heaters establish and maintain saturation temperature

(a) 78 heaters - total 1802 kW

(b) Divided into 4 groups — TP-11.2 EO-3a

i) Modulating Group - 12 heaters of 277 kW powered from Bus 6A

ii) Backup Group 31 - 24 heaters of 555 kW powered from Bus 3A

iii) Backup Group 32 - 21 heaters of 485 kW powered from Bus 2A

iv) Backup Group 33 - 21 heaters of 485 kW powered from Bus 5A

(c) Fuses provided at the penetration — MOD-92-3-253

(d) Control switch for each group

i) OFF-AUTO-ON for backup groups

ii) OFF-AUTO-ON-TRIP PULLOUT for modulating

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	2	2
K/A #	012 K5.01	
Importance Rating	3.3	3.8

Knowledge of the operational implications of the following concepts as they apply to the RPS: DNB.

Proposed Question: Common 16

Which ONE (1) of the following reactor trips is designed to protect the core from a departure from nucleate boiling (DNB) condition?

A. Power Range High Flux (high setpoint)

B. Reactor Coolant Loop Low Flow

C. Overpower-Delta Temperature

D. Pressurizer High Level

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Fuel integrity and total core power
B. Correct.
C. Incorrect. Fuel integrity
D. Incorrect. RCS pressure

Technical Reference(s): Tech Specs (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0938 (As available)

Modified Bank # __________ (Note changes or attach parent)
New __________

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis __________

10 CFR Part 55 Content: 55.41 X
55.43 __________

Comments:

16

i) It initiates an automatic rod withdrawal block (T_{AVG} /average T_{AVG} deviation)

ii) 2/4 logic ensures OTΔT Trip even with one channel failure

(3) Boiling point is function of pressure

(a) Rate of boiling is a function of power level

(b) DNB is dependent on coolant flow rate

(4) Protection system monitors system temperatures, pressure and power level to determine the OTΔT trip setpoint

(5) Trip occurs before DNBR decreases below 1.6

(a) DNBR is the max allowable heat flux for DNB divided by the actual measured heat flux

(b) Max allowable heat flux is a function of RCS temperature, pressure, flow, and hydraulic constraints

(c) Actual heat flux is a function of the hot channel factor and average reactor power

(6) Pressurizer pressure signal reduces the OTΔT setpoint when pressure is less than rated pressure, which reduces margin to DNB, also increases setpoint if pressure above normal

(7) (Δq) reduces the trip point to reflect an increase in hot channel factors **28-4, 28-5**

(a) Any deviation in the axial flux distribution is sensed by a difference between the upper and lower PR detectors

(b) Referred to as ΔI

(c) An F(Δq) of > 6.9% or less than -15.75% reduces OTΔT setpoint for cycle 12

i) For each % that $q_t - q_b > 6.9\%$, ΔT setpoint automatically reduced by 3.33%

ii) For each % that $q_t - q_b < -15.75\%$ T setpoint

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	014 A4.01	
	Importance Rating	3.3	3.1

Ability to manually operate and/or monitor in the Control Room: Rod selection control.

Proposed Question: Common 17

Given the following conditions:

- The plant is operating at 88% power.
- All Tavg channels are approximately 3°F higher than Tref

Which ONE (1) of the following modes on the Rod Control System Mode Selector Switch will provide the **slowest** rod speed when rod motion is initiated either manually or automatically?

A. Manual

B. Automatic

C. Control Bank 'D'

D. Shutdown Bank 'D'

Proposed Answer: B

Explanation (Optional):

A. Incorrect. 66 spm
B. Correct. 3 degree mismatch will move bank D rods at approximately 40 spm (8-72 spm band
C. Incorrect. 66 spm
D. Incorrect. 66 spm, is adjustable

Technical Reference(s): SD-16.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0858.c (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

17

lower the drive rod one step (5/8") at a time. There are 230 steps from full RCCA withdrawal to full insertion.

A solid state Rod Control System turns the magnetic coils on and off in a fixed sequence to produce control rod motion.

The system is controlled either manually or by the Automatic Rod Control System. Both of the components generate a rod speed and direction signal. When using MANUAL control, the direction signal is generated by the IN-HOLD-OUT switch and the speed signal is set at 66 steps per minute (SPM). In AUTOMATIC, the rod speed (8 to 72 SPM) and direction signals are developed by the Automatic Rod Control system.

The Automatic Rod Control System generates a rod speed and direction signal in response to two error signals. Actual coolant temperature is compared to a programmed reference temperature to develop the temperature error signal. Core power is compared to turbine power to develop the power mismatch circuit. The latter circuit actually compares the rate of change in nuclear power to the rate of change of turbine power to anticipate a power mismatch and resulting temperature deviation.

Power to the CRDM's is supplied by two motor-generator sets that are supplied power from two separate 480 volt three-phase buses. The AC power is distributed to five power cabinets through two series-connected reactor trip breakers. Bypass breakers can be connected in parallel with the reactor trip breakers to allow on line testing of the protection system.

Power to each cabinet from the bus duct is fed through three plug-in, fused, disconnect switches which serve the stationary, movable, and lift coil circuits of the mechanisms associated with that power cabinet. A reactor trip signal from the Reactor Protection System or the control room acts to open the two reactor trip breakers. Opening the trip breakers interrupts power to the CRDM's permitting the control rods to drop by gravity into the core.

The power cabinets provide the power to drive the control rod drive mechanisms. The power cabinet converts three phase AC power to DC power and applies this DC power to the electromagnetic coils. The actuating coils, consisting of a stationary gripper coil, a movable gripper coil, and a lift coil, are energized in the proper sequence for control rod movement. The sequence is determined by the logic cabinet. If the control rods are not in motion, they are held in place by keeping the stationary gripper coils energized.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	026 A1.01	
	Importance Rating	3.9	4.2

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CSS controls including: Containment pressure.

Proposed Question: Common 18

Given the following conditions:

- A LBLOCA occurs
- 32 Containment Spray pump is out of service for repair
- The team is performing actions contained in E-0, Reactor Trip or Safety Injection
- Containment Spray is required but cannot be actuated.

Which ONE (1) of the following describes the minimum action required to begin reducing containment pressure?

Start 31 Spray pump and...

A. Close all Phase B containment isolation valves

B. Open 31 Spray pump discharge isolation valve

C. Open 31 Spray pump suction and discharge isolation valves

D. Close all Phase B containment isolation valves and open the suction and discharge isolation valves

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Pump must be running

B. Correct. Discharge valves normally closed

C. Incorrect. Suction already open

D. Incorrect. Pump must be running

Technical Reference(s): E-0 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5791 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

18

Number:	Title:	Revision Number:
E-0	REACTOR TRIP OR SAFETY INJECTION	17

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
9.	* VERIFY Containment Spray Not Required: *	
	a. CHECK containment pressure - HAS REMAINED LESS THAN 22 PSIG	a. PERFORM the following: 1) ENSURE containment spray has initiated. 2) IF containment spray has NOT initiated, THEN manually INITIATE. 3) IF containment spray cannot be initiated manually, THEN manually START pumps and ALIGN valves. 4) Verify containment isolation phase B valves are closed. 5) IF containment isolation phase B valves are NOT closed, THEN manually CLOSE valves. 6) STOP all RCPs.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	033 A2.02	
	Importance Rating	2.7	3.0

Ability to (a) predict the impacts of the following malfunctions or operations on the Spent Fuel Pool Cooling System; and (b) based those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of SFPCS.

Proposed Question: Common 19

Given the following conditions:

- The plant is operating at 100% power.
- Spent Fuel Pit High Temp annunciator is in alarm
- Investigation reveals 31 SFP Cooling pump has tripped and will not restart
- 32 SFP Cooling pump is tagged out of service
- FSB ventilation is in service

Which ONE (1) of the following describes the additional preferred actions taken to maintain SFP cooling?

A. Initiate makeup as necessary using Primary water.

B. Initiate Bleed and Feed cooling of the SFP using the RWST.

C. Restore cooling using the Backup Spent Fuel Cooling System.

D. Increase Component Cooling water flow to the SFP heat exchanger and initiate recirculation of the SFP using the SFP Purification loop.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. PW not used at IP3

B. Incorrect. No bleed and feed option available

C. Correct.

D. Incorrect. CCW flow can be increased but purification will be taken out when cooling is lost

Technical Reference(s): ONOP-SFP-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5471 (As available)

Question Source: Bank #

Modified Bank # (Note changes or attach parent)

New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X

55.43

Comments:

R3
c19

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	**VERIFY Spent Fuel Pit temperature stable <u>OR</u> decreasing**	a. <u>IF</u> on Normal SFP Cooling, <u>THEN</u> ADJUST component cooling water flow to the Spent Fuel Pit Heat Exchangers per SOP-SFP-001 b. At the direction of the SM/CRS PLACE the NORMAL Spent Fuel Pit Cooling System in Service per SOP-SFP-001. c. At the direction of the SM/CRS PLACE the Backup Spent Fuel Pool Cooling System in Service per SOP-SFP-003. d. At the direction of the SM/CRS initiate temporary Spent Fuel Pit heat exchanger cooling by connecting a temporary hose from any one of the following to cool the spent fuel heat exchanger: • City Water • Primary Water • Fire Water e. <u>IF</u> Spent Fuel Pit temperature will exceed 120 F, <u>THEN</u> PERFORM the following: 1) PLACE FSB Ventilation in "EMERGENCY MODE" per SOP-V-2 FUEL STORAGE BUILDING HEATING AND VENTILATION 2) VERIFY Spent Fuel Pit Make-up will be available per SOP-SFP-1 should it become necessary. 3) Continue attempts to restore Spent Fuel pit cooling.

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Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	035 G2.4.4	
	Importance Rating	2.5	4.3

Emergency Procedures/Plan: Ability to recognize abnormal indications for system operating parameters which are entry-level conditions for emergency and abnormal operating procedures.

Proposed Question: Common 20

Given the following conditions:

- The plant is at 100% power
- All control systems are in their automatic alignments
- The selected 33 SG Steam Flow input fails low
- 33 SG level indicates 6% and trending down
- 31,32,34 SG levels indicate 48% and stable

Which ONE (1) of the following actions is required?

A. Place 33 SG feedwater regulating valve in manual and restore level to the normal band

B. Select the alternate steam flow channel and ensure 33 SG level is restored in automatic

C. Trip the reactor and enter E-0, Reactor Trip or Safety Injection

D. Restore program DP by raising MBFP speed in manual to match actual steam flow and feed flow

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Meet trip criteria
B. Incorrect. Would be correct if trip criteria not already met
C. Correct
D. Incorrect. Possible subsequent action if trip criteria was not met

Technical Reference(s): ONOP-FW-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1773 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	039 K1.06	
	Importance Rating	3.1	3.0

Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: Condenser steam dump.

Proposed Question: Common 21

Given the following conditions:

- Reactor power is 11%, with a plant startup in progress
- Steam dumps are modulated open in Pressure Control mode
- Tave – 551 degrees F
- RCS press – 2235 psig
- Main Steam Header pressure transmitter PT404 fails low

Which ONE (1) of the following is the expected response as startup continues?

A. Steam dumps modulate based on the Tref/Tave error signal generated as power rises

B. Steam dumps go shut because of the pressure error signal

C. Steam dumps modulate based on the no-load Tave error signal

D. Steam dumps open based on the steam pressure, but close when Tave is less than the Low Tave setpoint

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Tave mode not selected yet
B. Correct.
C. Incorrect. Pressure mode fed by PT-404, which is failed low
D. Incorrect. Dumps will not be open, and reactor trip signal required for the interlock described

Technical Reference(s): SD-18 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1494, 1497 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

21

c. The positioner controls the booster unit to modulate the valve

d. The booster passes air from SV-1 to the actuator

e. A spring loaded feedback circuit ensures the valve is positioned as desired

4. Trip open operation

a. Hi or hi-hi bistables open valves fully

b. SV-1 and 4 operate to arm the valves

c. SV-2 opens, SV-3 closes allowing full air pressure on the actuator

d. The modulation signal is overridden by a trip open signal

e. SV-2 and 3 will return to normal when the high or high-high demand bistables resets

f. Modulation then takes over to position the valve as desired

F. Mode Selector Switch - 3 positions — E.O.3 TP-2.3

1. Pressure

a. Provides auto steam pressure control at normal no-load steam pressure of 1005 psig

(1) PI-404 scale is 0-1200 psig. Setpoint can be changed using a dial (0-100) proportional to the PI-404 scale

b. Senses steam pressure (PT-404) upstream of turbine stop valves

c. Manual control using PC-404; normally used during plant cooldown and startup

d. "STEAM DUMP ARMED" alarm is in with the switch in "Pressure" position

2. Temperature

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	2	2
K/A #	055 K3.01	
Importance Rating	2.5	2.7

Knowledge of the effect that a loss or malfunction of the CARS will have on the following: Main condenser.

Proposed Question: Common 22

Given the following:

- The unit is at 100% power.
- All major controls are in AUTO and properly aligned for 100% power.

Assuming NO operator action, which ONE (1) of the following correctly describes symptoms of a malfunctioning main condenser air ejector on a unit at 100% power?

A. Steam flow to the Main Condenser rises; Main Generator Output lowers.

B. Steam flow to the Main Condenser lowers; Main Generator Output lowers.

C. Steam flow to the Main Condenser rises; Main Generator Output remains the same.

D. Steam flow to the Main Condenser lowers; Main Generator Output remains the same.

Proposed Answer: B – lowering vacuum reduces steam flow (Δ energy across turbine) and thereby generator output. Feedback to reactor is as if power is being lowered.

Explanation (Optional):

If an Air Ejector malfunctions, non-condensable gases will build in Main Condenser. As gases build, vacuum will decrease. If vacuum decreases, then backpressure is rising, which will cause a decrease in steam flow (Delta P from SGs to condenser lowers). When Steam flow through the turbine is reduced, electrical load will also be reduced

Technical Reference(s): Thermo? (Attach if not previously provided)

Proposed References to be provided to applicants during examination: None

Learning Objective: 1483.e (As available)

Question Source: Bank # X
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge ______
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	1
	K/A #	063 K1.03	
	Importance Rating	2.9	3.5

Knowledge of the physical connections and/or cause-effect relationships between the DC distribution system and the following systems: Battery Charger and battery.

Proposed Question: Common 23

Which ONE (1) of the following describes the operation of Battery Charger #35?

A. Can supply one of four separate DC busses. May be supplied from one of three separate power sources.

B. Can supply one of five separate DC busses. May be supplied from one of three separate power sources.

C. Can supply one of four separate DC busses. May be supplied from one of two separate power sources.

D. Can supply one of five separate DC busses. May be supplied from one of two separate power sources.

Proposed Answer: A

Explanation (Optional):

A. Correct. Busses 31-34 supplied, and charger can be connected to bus 2A,5A,6A
B. Incorrect. Cannot supply DC Bus 36
C. Incorrect. Has 3 sources, not 2
D. Incorrect. Wrong number of loads, wrong number of supplies

Technical Reference(s): EDS-L0709 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0274 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

XP3
CP3

II. PRESENTATION

A. Overview

1. Functions — E.O.2

   a. Supply DC power to equipment and components during normal plant operating conditions

   b. Supply DC power to safe shutdown equipment and components following a Loss of Offsite Power (LOOP)

   c. Supply DC power to ESF equipment and components following a postulated accident or postulated accident coincident with a LOOP

   d. Supply DC power to vital 120 VAC system during normal operation and following a LOOP, a postulated accident, or a postulated accident coincident with a LOOP

2. DC has an advantage because batteries can be used as a source of power if all AC sources are lost

   a. If lost due to electrical fault, breakers can operate to isolate the fault

   b. Plant instrumentation will remain operable

3. Battery chargers powered from 480 VAC are normal source of DC power

   a. Normally provide float charge to batteries while supplying DC loads

   b. Capable of supplying normal and intermittent DC loads while maintaining the battery fully charged

   c. Spare battery charger (#35) — E.O.2.b

      (1) Can supply 31-34 125 VDC Power Panel

      (2) Uses Maxi-Guard receptacle and individual disconnect switches

   d. 36 Battery Charger supplies emergency oil pumps

R3
C23

e. Output currents automatically limited — 110%

(1) #31, #32, and #35 - 440 amps
(2) #33 - 220 amps
(3) #34 - 165 amps

f. #35 Battery Charger power supply has been physically modified by MMP-98-3-128 such that power can be supplied from either MCC-36C (Bus 2A), MCC-36D (Bus 6A), or MCC-36E (Bus 5A). — E.O.3.a

g. Locations

(1) #31, #32, #34, and #35 in Cable Spreading Room on 33' Control Building — E.O.9.b

(2) #33 on 15' Control Building
#36 on 15' Turbine Building — E.O.9.b

4. 125 VDC Distribution Panels (6) — E.O.2.d

a. Supply power to remaining DC loads

(1) Relaying (including Reactor Trip and Safety Injection), indicating lights, SOVs, annunciators — See handout for panel breakdown

b. Load list given in Attachment 5 to ONOP-EL-5, "Loss of a DC Bus"

c. #31, #31A, and #33 supplied from DC Power Panel #31

d. #32, #32A, and #34 supplied from DC Power Panel #32

e. Locations — E.O.9.d

(1) #31, #32, #33, and #34 on CCR wall beside Flight Panel

(2) #31A and #32A on CCR wall beside protection racks

5. 345 kV Breaker Control & Unit Protection

a. Interposing relay

(1) Interfaces the plant control circuit to the breaker control circuit

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	2	1
K/A #	063 K3.02	
Importance Rating	3.5	3.7

Knowledge of the effect that a loss or malfunction of the DC Electrical System will have on the following: Components using dc control power.

Proposed Question: Common 24

Given the following conditions:

- The plant is operating at 100% power in a normal electrical lineup.
- A loss of 31 DC power panel results in a unit trip.
- One minute after the trip, 345 KV breaker 3 indicates CLOSED

Which ONE (1) of the following describes the reason for breaker 3 position and what action, if any, must be taken?

Breaker 3...

A. Did not open because it has not yet received a bus transfer signal. Wait 30 seconds prior to taking manual action.

B. Opened but breaker indication did not change due to the loss of DC power to the indicating lights

C. Did not open due to loss of DC control power. Force a breaker trip by manually actuating a relay

D. Did not open due to loss of control power. Breaker cannot be operated; open MOD F1-3 to isolate the line

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Will receive a signal within 30 seconds

B. Incorrect. Breaker still closed

C. Correct

D. Incorrect. Do NOT open MOD with current in the line

Technical Reference(s): ONOP-EL-5, Section 4.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5030.3 LIC-ONP-22 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4.0 INITIAL OPERATOR ACTIONS

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	**CHECK if unit trip or SI has occurred**	**Go to step 2**
	a. Go to E-0, REACTOR TRIP OR SAFETY INJECTION AND PERFORM ONOP-EL-5 in parallel with EOPs	
	b. VERIFY Generator Breakers 1 and 3 have tripped	b. MANUALLY TRIP Generator Breakers per Attachment 7 on page 26.
	c. Verify UT-1, UT-2, UT-3, and UT-4 breakers are **OPEN**	c. LOCALLY OPEN breakers per Attachment 6 on page 25.
2.	**Identify failed DC bus**	
	a. MONITOR DC voltmeter on rear of flight panel	
3.	**MAINTAIN Service Water Header Pressure**	
	a. VERIFY Service Water header pressure is adequate for plant loads – GREATER than 60 psig	a. Start additional Service Water pumps as necessary on that header.

ATTACHMENT 7
MANUAL TRIPPING OF GENERATOR BREAKERS 1 AND 3

CAUTION

125 VDC power exists on relay F721.

NOTE

Relay F721 is located inside the flight panel in the southeast section.

1. METHOD 1 Relay F721 (Direct Trip to Buchanan)

   a. Remove cover on relay F721.

   b. Depress the relay using a non-conductive device.

   c. Both generator breakers, 1 and 3, should trip open. If not, use method 2.

NOTE

The 86P and 86BU manual latch release is located inside the flight panel in the southeast section.

2. METHOD 2 86P and 86BU (Manually Unlatching 86P and 86BU)

   a. Remove cover on 86P and 86BU.

   b. Release the latch mechanism on both 86P and 86BU (anything can be used to release the latch mechanism since no electrical components are under these covers.)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	064 K3.03	
	Importance Rating	3.6	3.9

Knowledge of the effect that a loss or malfunction of the ED/G system will have on the following: ED/G (manual loads).

Proposed Question: Common 25

Given the following conditions:

- o The plant is operating at 100% power.
- o Following the last Surveillance Test on #32 EDG, the Unit-Parallel switch was inadvertently left in the PARALLEL position.
- o Subsequently, a loss of off-site power occurs, followed by a reactor trip and safety injection actuation

Which ONE (1) of the following describes the operation of 32 EDG for this event?

A. prevented from automatically assuming the loads on bus 6A

B. assume the loads on bus 6A but would eventually overspeed as it continually tries to pick up load

C. assume the loads on bus 6A at 60 Hz since the parallel function of this switch is bypassed during a SI

D. assume the loads on bus 6A but would operate at a reduced frequency due to the incorporation of Speed Droop

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Nothing preventing load from picking up
B. Incorrect. Would act this way if was p[laced in Unit mode during parallel ops
C. Incorrect. Switch is not bypassed. Unit mode is bypassed during SI
D. Correct.

Technical Reference(s): SD-27.3 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0795, 0800 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	2	2
K/A #	062 K1.03	
Importance Rating	3.5	4.0

Knowledge of the physical connections and/or cause-effect relationships between the AC distribution system and the following systems: DC Distribution.

Proposed Question: Common 26

Given the following conditions:

- The plant is operating at 81% power.
- A bus fault causes a trip and lockout of the normal feeder to 480 volt bus 3A.
- The cause of the fault has not been determined.

Which ONE (1) of the following describes the effect on Instrument Bus 34?

A. Energized from inverter 34 by DC bus 34, which is energized by Battery Charger 34.

B. Energized from inverter 34 by DC bus 34, which is energized by battery 34.

C. Energized from the alternate AC power supply from MCC 36C.

D. De-energized until manually transferred to the alternate AC power supply from MCC 36B.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Normal alignment, which is not available with charger de-energized
B. Correct.
C. Incorrect. Did not lose DC to inverter
D. Incorrect. No need for manual swap

Technical Reference(s): SD-27.5 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0283, 0284 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

IP3
C26

4. Instrument Bus #32/32A E.O.5

   a. Normal power supply

      (1) MCC-37 to battery charger #32
      (2) #32 DCPP supplies #32 static inverter
      (3) #32 static inverter supplies #32 Instrument Bus

   b. Backup power supply

      (1) Static Transfer Switch will transfer to backup on loss of inverter AC output

      (2) MCC-33 via SOLA transformer

      (3) MBS from MCC-33 to isolate inverter

5. Instrument Bus #33/33A E.O.5

   a. Normal power supply

      (1) MCC-36C to battery charger #33
      (2) #33 DCPP supplies #33 static inverter
      (3) #33 static inverter supplies #33 Instrument Bus

   b. Backup power supply

      (1) Static Transfer Switch will transfer to backup on loss of inverter AC output

      (2) MCC-39 via a SOLA transformer

      (3) MBS from MCC-39 to isolate inverter

6. Instrument Bus #34/34A E.O.5

   a. Normal power supply

      (1) MCC-32 to battery charger #34

      (2) DCPP #34 supplies #34 static inverter

      (3) #34 static inverter supplies #34 Instrument Bus

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	2	2
K/A #	012 G2.4.12	
Importance Rating	3.4	3.9

Emergency Procedures/Plan: Knowledge of general operating crew responsibilities during emergency operations.

Proposed Question: Common 27

Given the following conditions:

- o A manual reactor trip was initiated during a transient
- o Reactor trip did NOT occur
- o The team is entering FR-S.1, Response to Nuclear Power Generation/ATWS

Which ONE (1) of the following actions, if required, MUST be performed from memory? (Immediate Action)

A. Manually close MSIVs

B. Manually start AFW pumps

C. Open CH-MOV-333, Emergency Boration Valve

D. Start both Boric Acid Transfer pumps in high speed

Proposed Answer: A

Explanation (Optional):

Correct. Step 2 RNO for Turbine trip

Incorrect. Step 3

Incorrect. Step 4

Incorrect. Step 4

Technical Reference(s): FR-S.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5405, 5408 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

4.4.4 Immediate Actions (EOPs)

The WOG has identified three procedures that contain immediate operator actions.

4.4.4.1 The following procedures contain Immediate Action steps:

- E-0 REACTOR TRIP OR SAFETY INJECTION (Steps 1-4)
- FR-S.1 RESPONSE TO NUCLEAR GENERATION/ATWS (Steps 1-2)
- ECA-0.0 LOSS OF ALL AC POWER (Steps 1-2)

4.4.4.2 Immediate Actions in EOPs require that:

- Operators SHALL commit to memory and be able to perform the Immediate Actions without reference to the written procedure.
- Immediate Actions SHALL be performed immediately, without prompting.
- While the operators are performing Immediate Actions from memory, the CRS SHALL obtain the procedure and restart the procedure performance with the crew at Step 1.

4.4.4.3 Transitions OR unexpected conditions SHALL be called out during performance.

4.4.4.4 As a general rule, the operators should refrain from taking any additional operator actions, prudent or not, until the immediate operator actions are complete. The only exceptions are those actions specifically directed to be performed by ONOP.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

If at any time reactor power decreases to less than 5% with a Zero or Negative Startup Rate, THEN go to Step 15, Page 13.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	**VERIFY Turbine Trip:** • All turbine stop valves - CLOSED	PERFORM the following: a. Manually TRIP turbine. b. IF turbine will NOT trip, THEN manually REDUCE turbine load. c. IF unable to reduce turbine load, THEN PERFORM the following: 1) CLOSE all MSIVs. 2) IF MSIVs can NOT be closed, THEN DISPATCH NPO to locally close MSIVs per SOP-ESP-1. 3) DISPATCH NPO to ensure all MSIV bypass valves are closed, if required.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	2	2
	K/A #	079 K1.01	
	Importance Rating	3.0	3.1

Knowledge of the physical connections and/or cause-effect relationships between the SAS and the following systems: IAS.

Proposed Question: Common 28

Station Air system pressure decreases and stabilizes at 85 psig.

Which ONE (1) of the following describes the effect on Instrument Air and Station Air systems if the Instrument Air System pressure decreased to 88 psig?

A. Instrument Air pressure will stabilize at 88 psig and Station Air pressure will increase to 88 psig

B. Station Air pressure will remain at 85 psig and Instrument Air pressure will remain at 88 psig when PCV-1142 opens at 90 psig Instrument Air pressure

C. Instrument Air pressure will decrease to 85 psig and Station Air pressure will remain at 85 psig when PCV-1142 opens at 90 psig Instrument Air pressure

D. Station Air pressure will remain at 85 psig and Instrument Air pressure will remain at 88 psig when PCV-1142 opens at 90 psig Station Air pressure

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Will not equalize pressure
B. Correct.
C. Incorrect. Valve does not act as equalizing line for systems
D. Incorrect. Valve operates from IA, not Station Air pressure

Technical Reference(s): ONOP-IA-1 (Attach if not previously provided)
SD 29.2

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1794, 1799 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

28

2) Three (3) level control valves 1128, 1128A, and 1129 are used to maintain condensate system inventory by controlling the flow of condensate between the Condensate Storage Tank and the condenser hotwells. See the Condensate System Description 20 for further details. LCV-1128 and 1128A fail close on loss of Instrument Air. LCV-1129 fails close on loss of Instrument Air.

2.8.2.3 Heater Drain Valves

1) Three (3) 4" dump valves. These valves direct water from the Heater Drain Tank (HDT) to the condensers based on HDT level. See System Description 19 (Extraction Steam, Heater, Reheater) for further details. These valves fail open on loss of Instrument Air.

2) Three (3) 10" dump valves. These valves direct water from the Heater Drain Tank (HDT) to the condenser based on HDT level. These valves will open after the 4" dump valves open. See System Description 19 (Extraction Steam, Heater, Reheater) for further details. These valves fail open on loss of Instrument Air.

3) Two (2) Heater Drain Tank level control valves. These valves on the HDT pump discharges operate to control HDT level within the normal band. See System Description 19 (Extraction Steam, Heater, Reheater) for further details. These valves fail open on loss of Instrument Air.

2.9 System Cross Connections

2.9.1 Automatic Station Air to Instrument Air (Emergency)

An automatic emergency make-up supply of air is normally lined up from the Station Air system. (See System Description 29.3, Station Air.) The Station Air to Instrument Air cross tie is located at the southeast corner of the Turbine Building, 15' El. just south of the 6.9KV switchgear. Tapping off the Conventional plant Station Air header, the cross tie line continues onto isolation valve (IA-30). After passing through IA-30, the Station Air line splits into two (2) headers. One header to supply the Instrument Air system downstream of the IA receiver. The other header is an emergency source of air to the Weld Channel and Containment Penetration Pressurization System (WCCPPS).

The automatic emergency supply to the Instrument Air System from Station Air is through filter sets, a check valve and PCV-1142 located northwest corner 15' elevation of Control Building. The filter sets are in parallel and supplied through a three-way valve. The air passes

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	2	2
K/A #	086 K4.07	
Importance Rating	2.5	2.8

Knowledge of design feature(s) and/or interlock(s) which provide for the following: MT/G and T/G protection.

Proposed Question: Common 29

Which ONE (1) of the following describes the Fire Protection provided for the Turbine Generator housing and bearings?

A. Dry Pipe sprinkler and Foam

B. Wet Pipe sprinkler and Foam

C. Dry Pipe sprinkler and Carbon Dioxide

D. Wet Pipe sprinkler and Carbon Dioxide

Proposed Answer: C

A. Incorrect. No foam
B. Incorrect. Not wet pipe or foam
C. Correct
D. Incorrect. Not wet pipe

Explanation (Optional):

Technical Reference(s): SD-29.6 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 3302, 3304 (As available)

Question Source:	Bank #		
	Modified Bank #		(Note changes or attach parent)
	New	X	

Question History:

Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41	X
	55.43	

Comments:

JP3 C29

(7) Electrical Tunnel system consists of two separate systems (8/8A for EL 33'and 9/9A for 46'), one located on each side of both tunnels and extending into the Electrical penetration area.

(8) Branch line from the yard fire main supplies four deluge valves in the BIT room

(a) Manual actuation possible

(b) Auto actuation of deluge valves at 160°F by heat detectors

(9) Sprinkler head bulbs break at 175°Fin fire area.

(10) When system is activated, #31 to 34 north and south ventilation fans of upper and lower electrical tunnels shut down

(a) Fans automatically restart when fire alarm clears if in AUTO and tunnel temperature above fan setpoint

(11) Turbine generator housing and bearings have a dry pipe system as a normal automatic system.

(a) Backup protection is provided by CO_2 in manual

(12) Restoration is to shut isolation (OS&Y) valve, drain header, replace sprinkler head, reset Multimatic valves

j. Power conversion equipment (PCE) Building has:

(1) Local alarm panel with early warning smoke detectors and on FDCP

(2) Hose; CO_2 and dry chemical portable extinguishers

k. Intake Enclosure

(1) Alarm panel with early warning smoke detectors

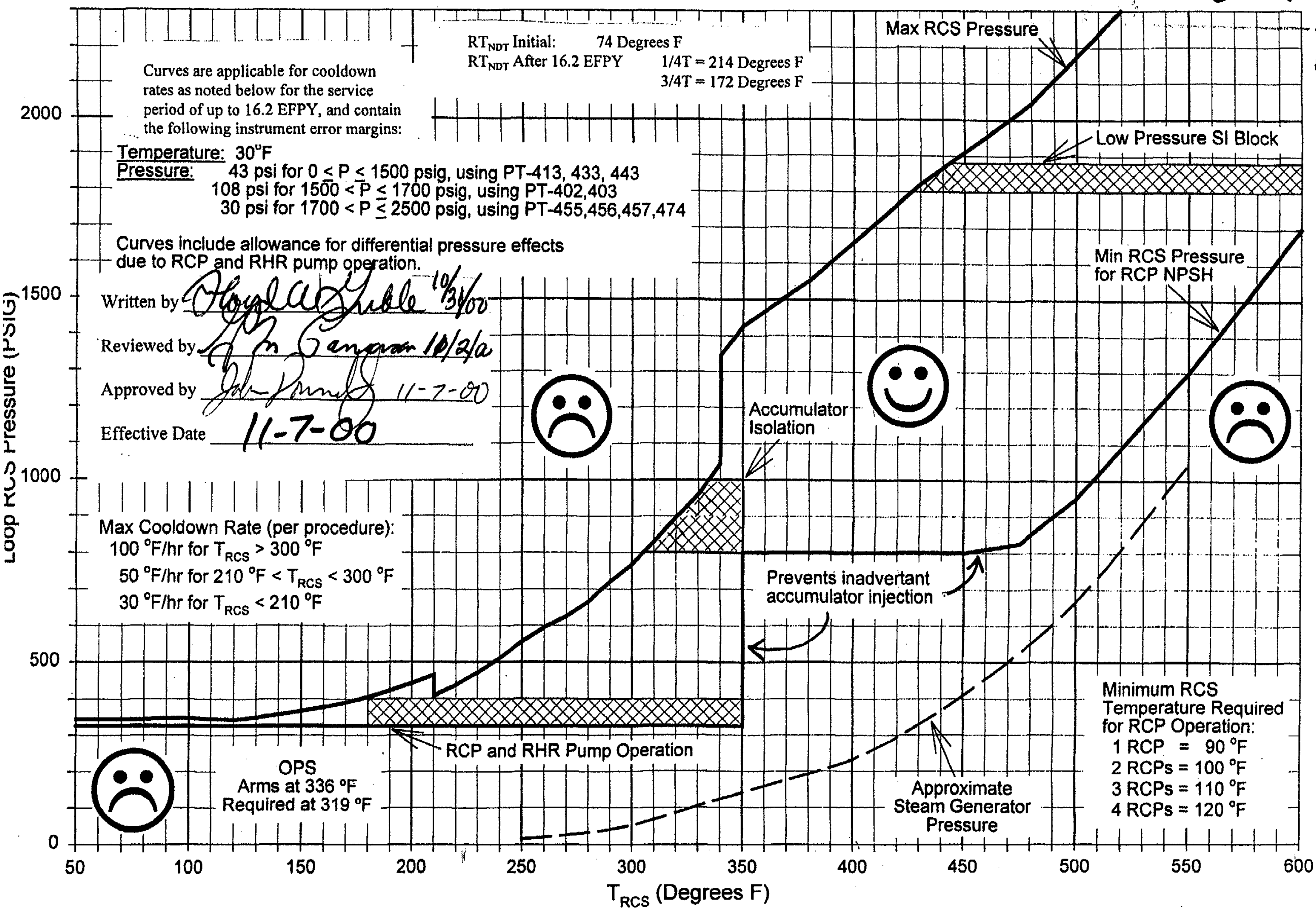
(2) North and South heat traced standpipes and hose stations

Graph RC 1G, Rev 7

Combined Cooldown / OPS Curve

Includes Minimum RCS Pressure for RCP NPSH and 1550 psid SG Tube Sheet ΔP

357



Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	3	3
	K/A #	005 A2.02	
	Importance Rating	3.5	3.7

Ability to (a) predict the impacts of the following malfunctions or operations on the RHRS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Pressure transient protection during cold shutdown.

Proposed Question: Common 30

The plant is being cooled down to cold shutdown. The following conditions exist:

- RHR has been placed in service.
- RCS TAVG is 260 °F
- RCS pressure increases rapidly to 600 psig.
- A Pressurizer PORV opens.
- RCS pressure stabilizes at 580 psig.
- No other actuations have occurred

Which ONE (1) of the following actions is required?

A. Open AC-MOV-730 and 731 to ensure adequate suction head for the RHR pumps.

B. Open AC-MOV-730 and 731 to ensure an adequate cold over pressurization relief path.

C. Close AC-MOV-730 and 731 to prevent over pressurization of the RHR system.

D. Close AC-MOV-730 and 731 to minimize RCS leakage pathways.

Proposed Answer: C

Explanation (Optional):

Incorrect. Should have auto close at 550 psig

Incorrect. Should have auto closed

Correct.

Incorrect. Not concerned with inventory, concerned with pressure

Technical Reference(s): ONOP-RHR-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: Graph RCS 1F, 1G

Learning Objective: 0231 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

IP3
C30

STEP	ACTION\EXPECTED RESPONSE	RESPONSE NOT OBTAINED

ATTACHMENT 1
RHR PUMP SUCTION VALVE CLOSURE

NOTE

- IF RCS pressure exceeds 550 psig, THEN AC-MOV-730 and AC-MOV-731 will close and can NOT be reopened until RCS pressure is less than 450 psig.
- RVLIS SHALL be the only RCS pressure indications used concerning RHR operation.
- RVLIS VAR SEL position 07 indicates that PR-402 (top) and PT-403 (bottom) which are in reality incorrect and are actually PT-410 (top) and PT-411 (bottom).

STEP	ACTION\EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	DETERMINE If RHR System Can Be Place In Service:	
	a. RCS temperature – LESS THAN 350°F	a. PERFORM the following: 1) MAINTAIN RCS temperature and pressure. 2) RETURN TO Plant Operating Procedure as directed by CRS or SM.
	b. RCS pressure – LESS THAN 400 PSIG • RVLIS display	b. PERFORM the following: 1) MAINTAIN RCS temperature and pressure. 2) RETURN TO Plant Operating Procedure as directed by CRS or SM.

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	2
Group #	3	2
K/A #	028 K6.01	
Importance Rating	2.6	3.1

Knowledge of the effect of a loss or malfunction of the following will have on the HRPS: Hydrogen recombiners.

Proposed Question: Common 31

Given the following conditions:

- A Large Break LOCA has occurred.
- Both Hydrogen Recombiners are in service.

If one of the operating Recombiners trips, which ONE (1) of the following describes the effect on the removal of Hydrogen from Containment?

A. Hydrogen concentration will remain below 4% with only one Recombiner in operation.

B. Hydrogen concentration will rise above 4% but remain below 13% with only one Recombiner in operation.

C. Hydrogen concentration will remain below 4% only if the Containment Purge System is placed in service in addition to the Recombiner.

D. Hydrogen concentration will remain below 4% only if Containment Spray is placed in service in addition to the Recombiner.

Proposed Answer: A

Explanation (Optional):

A. Correct. Either train will meet design function
B. Incorrect. 4% is the limit. 13% was chosen as the approximate value for explosive mixture
C. Incorrect. Purge system would not be placed in service as a result of a recombiner failure

D. Incorrect. Spray will not be in service at the pressures that H2 recombiners operate at.

Technical Reference(s): FSAR (Attach if not previously provided)
ESS-10

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0527, 0529 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

3\

(2) Aluminum corrosion

Other corrosion reactions have small effect relative to Aluminum

$$2Al + 3H_2O \dashrightarrow Al_2O_3 + 3H_2$$

The Boric Acid/NaOH solution produced by containment spray can cause additional aluminum corrosion/ hydrogen producing reactions. (depends on pH of solution).

b. Radiolytic decomposition of water (in core & sumps) caused by decaying fission products which provide the gamma for the reaction

$$2H_2O + \text{Energy } (\gamma) \rightarrow 2H_2 + O_2$$

4. The containment hydrogen concentration measurement system draws its sample from just upstream of the charcoal filters of the fan coolers

a. Monitors hydrogen generation rates and concentrations

5. The Hydrogen Recombiner System is designed to limit post accident VC hydrogen concentrations to 3% by volume — E.O.1, E.O.4

a. Two identical 100% capacity units are provided, each has a:

(1) Recombination unit

(2) Power supply cabinet

(3) Power control panel

b. Only one recombiner needs to be operated at a time to meet design criteria

(1) Self contained, uses natural convection for flow

(2) Has no moving parts

6. The Post-Accident Venting System is provided as a backup — E.O.1, E.O.4

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	3	2
	K/A #	027 A4.01	
	Importance Rating	3.3	3.3

Ability to manually operate and/or monitor in the Control Room: CIRS controls.

Proposed Question: Common 32

Which ONE (1) of the following correctly describes the operation of Containment Iodine Fan Filter Units?

A. May be started manually only.

B. May be started manually; automatically starts on high containment radiation.

C. May be started manually; automatically starts on any safety injection signal.

D. May be started manually; automatically starts on either high containment radiation or any safety injection signal

Proposed Answer: A

Explanation (Optional):

A. Correct
B. Incorrect. No auto actuations
C. Incorrect. No auto actuations
D. Incorrect. No auto actuations

Technical Reference(s): SD-10.3 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0508 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	3	3
	K/A #	041 A3.03	
	Importance Rating	2.7	2.8

Ability to monitor automatic operation of the SDS, including: Steam flow.

Proposed Question: Common 33

Given the following conditions:

- The plant is in Hot Standby
- Plant startup is in progress
- Steam dumps are modulating as required per procedure
- RCS temperature indicates 547°F

Which ONE (1) of the following actions will INCREASE steam flow through the Main Condenser steam dumps?

A. Withdraw Shutdown Bank "A" rods

B. Raise the steam dump pressure setpoint

C. Lower the steam dump pressure setpoint

D. Place steam dump control in "Temperature Control" mode

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Rods do not change Tave below POAH

B. Incorrect. Raise setpoint would actually lower flow, because higher pressure required to open valves

C. Correct.

D. Incorrect. Temp control would not open dumps because temp already less than or equal to no load

Technical Reference(s): SD-18 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1494 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	1	1
	K/A #	G2.1.8	
	Importance Rating	3.8	3.6

Ability to coordinate personnel activities outside the Control Room.

Proposed Question: Common 34

Given the following conditions:

- A reactor trip and safety injection has occurred.
- Transition was made to E-1, Loss of Reactor or Secondary Coolant.
- In accordance with RO-1, you are required to direct the Nuclear NPO to restart #31 PAB exhaust fan.

Which of the statements below correctly identifies the actions required to start this fan?

A. Transfer to the alternate power supply (MCC-312) for #31 PAB exhaust fan and start the fan.

B. Transfer the Fan Selector Switch to the Exhaust Fan #31 - Containment Building Purge Fan position and start the 31 PAB exhaust fan.

C. Ensure the Fan Selector Switch is selected to the Exhaust Fan #31 - PAB Supply fan position and start the fan

D. Remove the thermal overloads for PAB Supply fan and close the breaker then start #31 PAB Exhaust Fan.

Proposed Answer: C

Explanation (Optional):

Incorrect. Should already be aligned

Incorrect. Wrong fan 31

Correct

Incorrect. No need to remove overloads or bypass any function

Technical Reference(s): RO-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not Available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	3	3
Group #	2	2
K/A #	G2.2.13	
Importance Rating	3.6	3.8

Knowledge of tagging and clearance procedures.

Proposed Question: Common 35

Which ONE (1) of the following sets of tags can be hung simultaneously on the same component, in accordance with AP-10.1, Protective Tagging?

A. A Danger and a Caution tag

B. Two (2) Test and Maintenance tags

C. A Danger tag and a Test and Maintenance tag

D. A Caution tag and a Test and Maintenance tag, only if each holder signs onto both tagouts.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. 2 T & M tags cannot be hung together.

C. Incorrect. T & M tags not allowed on Danger tagged components

D. Incorrect. Tags allowed, but no one signs onto Caution tagouts

Technical Reference(s): AP-10.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 3939 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank Editorially modified
Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

4.8.1.3 Issuance of CTOs and application and removal of Caution tags is identical to the procedure for Tagouts, except that component verification of tags is NOT required.

4.8.1.4 CTOs are NOT to be used in place of writing procedural guidance or issuing appropriate Temporary Procedure Changes (TPCs).

4.8.2 Protective Tag Outs

4.8.2.1 WHEN applying, removing or verifying Tagouts, THEN it is permissible to work from multiple copies of the tag out, as long as the sequence is NOT affected. Upon completion, all signatures SHALL be entered in SOMS.

- A briefing or other coordination method may be used to ensure the sequence is NOT affected.

4.8.2.2 Use of Danger and Caution Tags on the same component is permissible.

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4.8.2.3 WHEN Danger and Caution Tags are placed on the same component, THEN the Danger Tag SHALL take precedence over all tags.

4.8.2.4 WHEN protection requires an air line depressurized, THEN place separate Danger Tags on both the isolation valve and its bleed path.

4.8.2.5 WHEN protection requires a component de-energized, THEN place separate Danger Tags on both the breaker disconnect and for fuses removed.

4.8.2.6 All power operated valves (MOVs, AOVs, SOVs, PCVs, TCVs) used as isolation boundaries for protection SHALL be isolated and/or blocked so a loss or application of power or control air does NOT operate the valve used for isolation. Control and/or actuating power, etc., which operates these valves should be removed and properly tagged. Special attention to the failure position (e.g., failure of power or failure of control air) of these valves needs to be addressed when the operator is forced to rely on power operated valves for protection. **{Reference 7.1.9}**

4.8.2.7 WHEN tagging out air to air operated components, THEN ENSURE air trapped between the solenoid operated valve and the air operated component (AOV diaphragm) is bled off in a controlled manner.

C35

4.8.3 Test & Maintenance Tags

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CAUTION

Test & Maintenance Tags SHALL NOT be used to provide personnel or equipment protection.

NOTE

Normally, Planning identifies a Test & Maintenance Tag is needed for the proposed work (e.g., MOVATS testing, AOV limit switch setting, etc.)

4.8.3.1 Test & Maintenance Tags SHALL only be controlled by use of a tagout.

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4.8.3.2 A Test & Maintenance Tag SHALL only be used where the equipment can be safely operated within established boundaries.

4.8.3.3 A Test & Maintenance Tag SHALL NOT be used for configuration control.

4.8.3.4 A component SHALL NOT be assigned more than one Test & Maintenance Tag.

4.8.3.5 IF a Test & Maintenance tag is applied to a component, THEN a Danger Tag or a 'No Tag' may NOT be hung on that component. A maintenance lock may be applied "on top" of an operations SOMS Test & Maintenance tag when personnel or equipment protection is required.

4.8.3.6 Test & Maintenance tagged equipment SHALL only be operated by the Tag out Holder or designee.

4.8.3.7 The Tag out Holder is responsible for coordinating manipulations during maintenance activities and ensuring that:

- All personnel working on affected equipment are notified before operation.
- Affected personnel take appropriate safety precautions such as standing clear before equipment operation.
- Tagged components are placed in a protective position whenever equipment under maintenance is NOT being operated

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	2	2
	K/A #	G2.2.33	
	Importance Rating	2.5	2.9

Knowledge of control rod programming.

Proposed Question: Common 36

Given the following conditions:

- The Control Rod Full Out position is 230 steps.
- The Bank Overlap Unit is set for normal operation.

During rod withdrawal, when Control Bank "B" reaches full out position, what will be the position of Control Bank "C"?

A. 000 steps

B. 104 steps

C. 126 steps

D. 230 steps

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Bank D would still be 0 steps, but Bank C will withdraw when Bank B reaches 126 steps
B. Correct. Bank C will begin withdrawal at B = 126 steps
C. Incorrect. Assumes withdrawal starts at 104 steps on B
D. Incorrect. Would have to assume Bank C is withdrawn before B

Technical Reference(s): SD-16.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0859 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis Comp

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

36

There are five power cabinets, located on the control building 33' elevation, and each is named for the banks and groups it supplies, except for power cabinet SCD which powers shutdown banks C and D. The other four power cabinets are designated: 1AC, 1BD, 2AC, and 2BD. The number designates the group supplied. The letters designate the banks supplied. Power cabinet 1AC supplies group 1 of shutdown bank A, control bank A, and control bank C. Thus, each power cabinet supplies 2 control banks and one shutdown bank (except for power cabinet SCD).

The logic cabinet, which is located on the control building 33' elevation, generates current regulating signals for the power cabinets, based upon speed and direction control input signals. Two types of signals are sent to the power cabinets: 1) bank selection (multiplexing) signals which determine the bank(s) to move, and 2) step sequencing signals which establish the direction and speed of the selected or programmed bank(s). There are two types of step sequencing signals: 1) command pulses that control when the power cabinets deliver power to the CRDM's, and 2) current orders that control how much power is delivered.

Twenty-nine of the 53 RCCA's are referred to as control bank rods and are used for short-term reactivity control. The remaining 24 control rods are referred to as shutdown bank rods and are maintained at the top of the core. These shutdown banks are capable of inserting enough negative reactivity to bring the reactor subcritical, when tripped, under all permissible operating conditions. Since the shutdown banks are always at the top of the core, they do not require an automatic system and are always operated manually.

To increase the capability of the control rods to provide fine reactivity control, the control rod banks are divided into two groups. The groups within a bank will move alternately so that the instantaneous reactivity insertion rate is small. The rods in a given group are arranged symmetrically in the core to ensure balanced flux and power distribution.

Bank overlap is used because of the varying rod worth of the control rods as they move from the bottom to the top of the core. The bank will have its greatest worth near the center of the core and will have a minimum worth near the top and bottom of the core. For this reason, the control banks are overlapped for 104 steps during withdrawal and insertion to achieve a more nearly constant reactivity insertion rate. This overlap occurs only when the bank selector switch is in the MANUAL or AUTOMATIC position. During overlap, two banks move in unison; group one from both banks stepping together and

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	2	2
	K/A #	G2.2.2	
	Importance Rating	4.0	3.5

Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels.

Proposed Question: Common 37

The following plant conditions exist during a mid-cycle reactor start-up:

- The MSIVs are closed
- The reactor is critical
- RCS Boron is 850 PPM.
- Bank D at 180 steps
- The RO withdraws control rods 12 steps
- Startup rate is 0.3 DPM

Without further action, which ONE (1) of the following describes the expected plant response to the rod withdrawal?

When the Point of Adding Heat is reached,

A. T_{avg}, power level, pressurizer pressure and level will all increase until the reactor trips at 10% power.

B. T_{avg}, power level, pressurizer pressure and level will increase until the condenser steam dumps open to stabilize power at a higher level.

C. T_{avg}, power level, pressurizer pressure and level will increase until the atmospheric steam dumps open to stabilize power at a higher level.

D. T_{avg} will increase which will add negative reactivity causing power to decrease, which will drive the reactor sub-critical unless rods are withdrawn further.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. With negative MTC, power will stabilize
B. Incorrect. Condenser steam dumps are unavailable with MSIVs closed
C. Correct
D. Incorrect. Would not happen before POAH.

Technical Reference(s): POP-1.2 Theory (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: N/A (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	3	3
Group #	3	3
K/A #	G2.3.9	
Importance Rating	2.5	3.4

Knowledge of the process for performing a containment purge.

Proposed Question: Common 38

Given the following conditions:

- The plant is in Mode 5.
- Preparations are underway for a Containment Purge.
- Purge Supply and Exhaust isolation valves are open
- The selected fans control switch is placed in CLOSE

Which ONE (1) of the following describes the events that would automatically terminate or discontinue the purge?

A. If smoke is detected, the operating fans trip, and the Containment Purge isolation valves must be manually closed.

B. If selected fans do not start within 60 seconds, the isolation valves will close.

C. If WCCPPS pressure is not released within 190 seconds, the fans will not start.

D. If the Fire Detection System Fan Interlock Bypass switch is in BYPASS, the fans will not start.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Fans will trip
B. Correct.
C. Incorrect. Valve open interlock
D. Incorrect. Not an interlock; if switch enabled, enables fan trips on smoke detection

Technical Reference(s): SOP-CB-3 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

____ 4.2.1.5 START CB Purge System from Fan House Ventilation Control Panel as follows:

____ a) SELECT Fan Selector Switch position that corresponds to desired operating fan combination:

SWITCH POSITION	OPERATING PAIR
D-C	Exhaust Fan 32 And CB Purge Fan
A-C	Exhaust Fan 31 And CB Purge Fan
A-B; D-C	Exhaust Fan 31 And PAB Supply Fan Exhaust Fan 32 And CB Purge Fan

NOTE

Normal position of Fire Detection System Fan Interlock Bypass Switch will allow smoke detector actuation to trip CB purge fans.

____ b) ENSURE Fire Detection System Fan Interlock Bypass Switch For Fan CBP-31 CBP-32 & CBPR, is in Normal.

NOTE

<u>IF</u> WCCPPS pressure between valves is <u>NOT</u> released within 190 (Ref. 5.2.4) seconds following switch actuation, <u>THEN</u> isolation valves will <u>NOT</u> open.

____ c) OPEN the following valves:

- ____ VS-FCV-1170, Containment Bldg Inside Purge Supply Valve
- ____ VS-FCV-1172, Containment Bldg Inside Purge Exhaust Valve
- ____ VS-FCV-1171, Containment Bldg Outside Purge Supply Valve
- ____ VS-FCV-1173, Containment Bldg Outside Purge Exhaust Valve

NOTE

IF CB Purge Supply Fan AND selected exhaust fan are NOT started within 60 (Ref. 5.2.4) seconds after isolation valves are full open, THEN isolation valves will close.

_____ d) WHEN all 4 CB purge isolation valves are Open, THEN PLACE Fan Control Switch in CLOSE.

_____ e) ENSURE CB Purge Supply Fan Inlet Louvers are open.

_____ f) REFER TO Step 4.2.1.2 and PERFORM 3PT-Q075A, Channel Functional Test RM 11/12.

_____ **4.2.2 Shutdown**

_____ 4.2.2.1 SECURE CB Purge System at Fan House Ventilation Control Panel as follows:

NOTE

The following step will secure PAB Ventilation. SOP-V-001, Primary Auxiliary Building Heating and Ventilation System Operation, provides guidance on establishing PAB ventilation.

_____ a) PLACE Fan Control Switch in TRIP.

_____ b) ENSURE all CB Purge Valves are closed:

- _____ VS-FCV-1170, Containment Bldg Inside Purge Supply Valve
- _____ VS-FCV-1172, Containment Bldg Inside Purge Exhaust Valve
- _____ VS-FCV-1171, Containment Bldg Outside Purge Supply Valve
- _____ VS-FCV-1173, Containment Bldg Outside Purge Exhaust Valve

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	3
	Group #	4	4
	K/A #	G2.4.19	
	Importance Rating	2.7	3.7

Knowledge of EOP layout, symbols, and icons.

Proposed Question: Common 39

How are EOP substeps designated if they must be performed in the order in which they are listed?

A. Substeps are designated by bullets

B. The entire step is surrounded by a solid line

C. The major step is designated with an asterisk

D. Substeps are designated by alpha-numeric characters

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Used if sequence is unimportant
B. Incorrect. Cautions and notes surrounded by a line
C. Incorrect. Designates not continuously applicable
D. Correct. Letters or numbers listed sequentially

Technical Reference(s): EOP User's Guide (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: ______________________ (As available)

Question Source: Bank # ______________

Modified Bank # X ______________ (Note changes or attach parent)

New ______________

Question History: Vendor Bank

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis ______________

10 CFR Part 55 Content: 55.41 X

55.43 ______

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	3	3
Group #	4	4
K/A #	G2.4.29	
Importance Rating	2.6	4.0

Knowledge of the emergency plan.

Proposed Question: Common 40

Which of the following is the LOWEST emergency classification at which the Emergency Operations Facility (EOF) MUST be activated?

A. Unusual Event

B. Alert

C. Site Area Emergency

D. General Emergency

Proposed Answer: B

Explanation (Optional):

A. Incorrect. NUE does not require ERF staffing
B. Correct.
C. Incorrect. Already staffed
D. Incorrect. Already staffed

Technical Reference(s): E-Plan (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: ____________________ (As available)

Question Source: Bank # X

Modified Bank # ____________________ (Note changes or attach parent)

New ____________________

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis ____________________

10 CFR Part 55 Content: 55.41 X

55.43 ________

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	005 AK1.03	
	Importance Rating	3.2	3.6

Knowledge of the operational implications of the following concepts as they apply to the stuck rod: Xenon transient.

Proposed Question: Common 41

Given the following conditions:

- A rapid load reduction from 100% to 70% power was performed.
- Control Bank D rods were inserted to 180 steps.
- One Control Bank D rod did not move and is currently at 214 steps.

Which ONE (1) of the following describes a concern associated with the rod misalignment?

A. Xenon buildup in the area of the stuck rod may immediately affect core power distribution

B. Xenon burnout in the area of the stuck rod may immediately affect core power distribution

C. Xenon buildup in the area of the inserted rods may affect core power distribution if left uncorrected

D. Xenon burnout in the area of the inserted rods may affect core power distribution if left uncorrected

Proposed Answer: C

Explanation (Optional):

A- Incorrect. Xenon will not immediately affect core power distribution. The effects of xenon will be felt an hour after the transient.

B- Incorrect. Burnout at the affected location should not be occurring. Not immediately either

C- Correct. When power is reduced locally, as in the case of inserted rods, xenon will build in for several hours, further depressing flux in that area. In the area of the stuck rod, xenon will not be building in because flux stayed the same or increased (relative to inserted rods)

D- Incorrect. Xenon will not burn out in the area of the inserted rods

Technical Reference(s): (Attach if not previously provided)

Theory

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not Available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	E09 EK3.1	
	Importance Rating	3.3	3.6

Knowledge of the reasons for the following responses as they apply to the (Natural Circulation Operations): Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics.

Proposed Question: Common 42

The team is preparing to cool down the plant to Cold Shutdown in accordance with ES-0.2, Natural Circulation Cooldown.

What is the maximum allowed cooldown rate and why is this limit imposed?

A. Less than 50°F per hour to prevent exceeding Tech Spec cooldown limits

B. Less than 50°F per hour to minimize the probability of creating a void in the reactor vessel

C. Less than 25°F per hour to prevent exceeding Tech Spec cooldown limits

D. Less than 25°F per hour to minimize the probability of creating a void in the reactor vessel

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Wrong rate and wrong reason
B. Incorrect. Wrong rate
C. Incorrect. Wrong reason
D. Correct.

Technical Reference(s): ES-0.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5365 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: INPO Bank
Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

42

Number:	Title:	Revision Number:
ES-0.2	NATURAL CIRCULATION COOLDOWN	15

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
6.	<u>INITIATE RCS Cooldown To Cold Shutdown:</u>	
	a. MAINTAIN cooldown rate in RCS cold legs - LESS THAN 25°F/HR	
	b. DUMP steam to condenser	b. PERFORM the following: 1) Manually OPEN SG(s) atmospherics. 2) <u>IF</u> unable to open atmospheric(s), <u>THEN</u> DISPATCH NPO to open SG(s) atmospherics per SOP-ESP-1.
	c. MAINTAIN SG NR level - AT 45%	c. CONTROL feed flow to maintain 45% level.
	d. MAINTAIN RCS cold leg temperature and pressure - WITHIN LIMITS OF OPERATIONS GRAPH RCS-1B	
7.	<u>CHECK RCS Hot Leg Temperatures - LESS THAN 540°F</u>	RETURN To Step 6.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	024 AA2.04	
	Importance Rating	3.4	4.2

Ability to determine and interpret the following as they apply to the Emergency Boration: Availability of BWST.

Proposed Question: Common 43

Given the following conditions:

- An ATWS has occurred.
- The team is performing actions of FR-S.1, Response to Nuclear Power Generation/ATWS.
- The team has initiated Emergency Boration.
- All equipment has operated as designed.
- SI is NOT actuated.
- RCS pressure is 2210 psig and Trending DOWN.
- Tavg is 567°F and Trending DOWN.

Which ONE (1) of the following describes plant response to initiation of the boration?

A. Boric Acid Tank level will be dropping at a rate approximately equal to Charging flow.

B. Volume Control Tank level will be dropping at a rate approximately equal to Charging flow.

C. Refueling Water Storage Tank level will be dropping at a rate approximately equal to Charging flow.

D. Pressurizer level will be rising at a rate approximately equal to Charging flow.

Proposed Answer: A

A. Correct. BAT will be supplying borated water if everything works properly
B. Incorrect. VCT level may actually be rising because there is no outflow, and Letdown may still be flowing
C. Incorrect. RWST not supplying any water unless equipment does not work properly or SI is initiated
D. Incorrect. In a transient like an ATWS, pressurizer level will also be in a transient state, due to RCS mass changing from temperature changing

Technical Reference(s): FR-S.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1139.b (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	026 AK3.03	
	Importance Rating	4.0	4.2

Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: Guidance actions contained in EOP for Loss of CCW/Nuclear Service Water.

Proposed Question: Common 44

Given the following conditions:

- The plant is in Mode 5
- RCS temperature is 190°F
- A loss of Off-site power occurs.
- EDGs do NOT load onto the 480 volt busses
- Power is restored to the 480 volt busses from off-site
- When restoring CCW, the pump control switch is placed in STOP/OFF prior to starting the pump.

Which ONE (1) of the following describes the reason for placing the pump control switch in STOP/OFF?

A. It resets the pump 86 lockout relay

B. It charges the breaker closing spring

C. It resets the common annunciator

D. It bypasses the Low Pressure Start signal for 60 seconds

Proposed Answer: A

Explanation (Optional):

A. Correct

B. Incorrect. Closing spring charged when bkr opens

C. Incorrect. Annunciator reset on panel

D. Incorrect. No LP start bypass with control switch

Technical Reference(s): SD 4.1 (Attach if not previously provided)
ONOP-EL-4

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5469.3 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

ATTACHMENT 2
LOSS OF OFFSITE POWER -
COLD SHUTDOWN FUEL IN VESSEL

1. IF RHR cooling has NOT been restored THEN go to ONOP-RHR-1
2. SECURE any waste release in progress.
3. IF ANY 480V Safeguards bus is De-Energized, THEN:
   a. Attempt to start any EDG per SOP-EL-1, DIESEL GENERATOR OPERATIONS
4. IF ANY Emergency Diesel Generator is running, THEN:
   a. Check EDG for affected 480V Bus(es)
      - 480V Bus 6A
      - 480V Bus 5A
      - 480V Bus 2A
   b. MATCH 480V Bus Emerg Feed breaker control switch flag(s) for running EDG(s)
   c. SHUTDOWN the following pumps that are NOT required for current plant conditions:
      - Essential Service Water pump(s)
      - Component Cooling pump (s)
      - Auxiliary Boiler Feedwater Pump(s)
   d. DISPATCH NPO to monitor running EDG(s):
      - SOP-EL-1, DIESEL GENERATOR OPERATION, Monitoring EDG During An Emergency
5. START Non-Essential Service Water pump(s) as directed by CRS or SM.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	2
	K/A #	027 AA2.15	
	Importance Rating	3.7	4.0

Ability to determine and interpret the following as they apply to the Pressurizer Pressure Control Malfunctions: Actions to be taken if PZR pressure instrument fails high.

Proposed Question: Common 45

Given the following conditions:

- The plant is at 100% power.
- All control systems are in their normal automatic alignments.
- Pressurizer pressure channel PT-455 indicates 2275 psig and slowly rising.
- All other narrow range pressurizer pressure indications are 2220 psig and slowly dropping

Which ONE (1) of the following actions is required next?

A. Place the pressurizer pressure controller in manual and control RCS pressure.

B. Place the affected PORV control switch in 'close'

C. Reset and reenergize pressurizer heaters

D. Trip the reactor, enter E-0, Reactor Trip or Safety Injection

Proposed Answer: A

Explanation (Optional):

A. Correct. Controlling channel is failing
B. Incorrect. Only for channels directly impacting PORVs
C. Incorrect. Heaters will not energize until pressure control in manual
D. Incorrect. Rx trip criteria not yet met

Technical Reference(s): ONOP-RPC-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1952 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

JP3 / C45

ATTACHMENT 7
PRZR PRESSURE CHANNEL FAILURES

(Attachment page 1 of 8)

1. IF affected channel is in control, THEN PERFORM the following:

   a. PLACE PRZR pressure master controller in MAN.

   b. CONTROL PRZR pressure to maintain 2235 psig.

2. IF PI-457 has failed, THEN PLACE control switch for PCV-456 in CLOSE position.

3. IF PI-474 has failed, THEN PLACE control switch for PCV-455C in CLOSE position.

4. PLACE P/455A, PRESS DEFEAT switch, for the failed instrument to the required position: (Foxboro Rack B-6)

FAILED INSTRUMENT	AFFECTED CHANNEL	REQUIRED POSITION (Foxboro Rack B-6)
PI-455	Channel I (Red)	DFT CH I IV
PI-456	Channel II (White)	DFT CH II III
PI-457	Channel III (Blue)	DFT CH II III –or– DFT CH III IV
PI-474	Channel IV (Yellow)	DFT CH I IV –or– DFT CH III IV

5. PLACE the ΔT DEFEAT switch for the failed instrument to the required position: (Foxboro Rack B-8)

AFFECTED RCS LOOP	FAILED INSTRUMENT/COLOR	ΔT DEFEAT SWITCH	REQUIRED POSITION (Foxboro Rack B-8)
Loop 1	PI-455 (Red)	3T/411A	DFT CH I
Loop 2	PI-456 (White)		DFT CH II
Loop 3	PI-457 (Blue)	3T/411B	DFT CH III
Loop 4	PI-474 (Yellow)		DFT CH IV

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	040 AK1.06	
	Importance Rating	3.7	3.8

Knowledge of the operational implications of the following concepts as they apply to Steam Line Rupture: High-energy steam line break considerations.

Proposed Question: Common 46

Which ONE (1) of the following sets of conditions will result in the MOST SEVERE reactivity excursion during a Main Steam Line Break?

A. 10% power, RCS Boron = 200 ppm

B. 10% power, RCS Boron = 1200 ppm

C. 100% power, RCS Boron = 200 ppm

D. 100% power, RCS Boron = 1200 ppm

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. End of Life has a higher MTC than BOL

C. Incorrect. High power, less mass in SG to boil off

D. Incorrect. High power, less mass in SG to boil off. Also BOL

Technical Reference(s): FSAR, T&AA (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not Available (As available)

Question Source: Bank # Vendor Bank
Modified Bank # ________ (Note changes or attach parent)
New ________

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge ________
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 ________

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	1	1
Group #	1	1
K/A #	E12 EA1.2	
Importance Rating	3.6	3.7

Ability to operate and/or monitor the following as they apply to the (Uncontrolled Depressurization of all Steam Generators): Operating behavior characteristics of the facility.

Proposed Question: Common 47

During the performance of ECA-2.1, Uncontrolled Depressurization of All Steam Generators, the following plant condition exists:

- Cooldown rate of the RCS is greater than 100°F/hour

How is the team directed to control feedwater flow?

A. Feedwater flow is terminated to all but a single intact S/G, which is fed at 100 gpm

B. Feedwater flow is maintained at least 365 gpm total until any SG narrow range is >9%

C. Feedwater flow is maximized to all S/Gs until narrow range level in any SG is >9%

D. Feedwater flow is reduced to 100 gpm to each S/G with narrow range level less than 9%

Proposed Answer: D

Explanation (Optional):

A. Incorrect. All SGs are fed

B. Incorrect. Normal criteria

C. Incorrect. Do not terminate flow

D. Correct.

Technical Reference(s): ECA-2.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5518 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Number:	Title:	Revision Number:
ECA-2.1	UNCONTROLLED DEPRESSURIZATION OF ALL STEAM GENERATORS	15

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

A MINIMUM FEED FLOW OF 100 GPM MUST BE MAINTAINED TO EACH SG WITH A NARROW RANGE LEVEL LESS THAN 9% [14%].

NOTE

Shutdown Margin should be monitored during RCS cooldown.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	CONTROL Feed Flow To Minimize RCS Cooldown:	
	a. VERIFY all control rods - LESS THAN 20 STEPS	a. IF two OR more control rods are withdrawn more than 20 STEPS, THEN CONSULT TSC Reactor Engineering for SDM requirements.
	b. CHECK cooldown rate in RCS cold legs - LESS THAN 100°F/HR	b. PERFORM the following: 1) DECREASE feed flow to 100 gpm to each SG. 2) GO To Step 2.d.
	c. CHECK all SG NR levels - LESS THAN 50%	c. CONTROL feed flow to maintain all SG NR levels less than 50%.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	051 AA1.04	
	Importance Rating	2.5	2.5

Ability to operate and / or monitor the following as they apply to the Loss of Condenser Vacuum: Rod position.

Proposed Question: Common 48

Given the following conditions:

- The Unit is operating at 100% power with all systems in automatic alignments.
- The crew is referring to the ARPs due to a condenser vacuum alarm.

Assuming no action has been taken by the crew, which ONE of the following describes the response of the rod control system to this event?

Control rods will automatically...

A. insert due to the rise in condenser backpressure causing a rise in Tavg – Tref deviation.

B. insert due to the drop in condenser backpressure causing a rise in Tavg – Tref deviation.

C. withdraw due to the rise in condenser backpressure causing a drop in Tavg – Tref deviation.

D. withdraw due to the drop in condenser backpressure causing a drop in Tavg – Tref deviation.

Proposed Answer: A

Explanation (Optional):

A. Correct. Control rod motion in automatic will maintain Tavg.
B. Incorrect. Backpressure will rise.
C. Incorrect. Rods insert.

D. Incorrect. Rods insert, and backpressure will rise.

Technical Reference(s): Sim (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 6194 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank
Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	055 EA2.01	
	Importance Rating	3.4	3.7

Ability to determine or interpret the following as they apply to a Station Blackout: Existing valve positioning on a loss of instrument air system.

Proposed Question: Common 49

Given the following plant conditions:

- Reactor Trip and Turbine Trip has occurred from 100% power
- Loss of all AC power has occurred
- Each Steam Generator Atmospheric Dump Valve controller's output is full open
- Steam Driven Auxiliary Feedwater Pump is supplying feedwater to all four Steam Generators
- Steam Flow is approximately 0 pounds mass per hour from the 31 S/G and 34 S/Gs approximately 30 minutes after the trip

Which ONE (1) of the following statements explains the steam flow indication?

A. Main Steam Isolation Valves closed on an automatic isolation signal.

B. Main Steam Isolation Valves closed on loss of AC power.

C. Steam Generator Atmospheric Dump Valves closed on loss of Instrument Air.

D. Steam Generator Atmospheric Dump Valves closed on loss of AC power.

Proposed Answer: C

Explanation (Optional):

A. The steam flow indication is upstream of the MSIV. Closure of the MSIVs (which may not have occurred) would not affect steam flow indication.
B. MSIV control power is not affected by the loss of AC power
C. S/G Atmospheric Relief Valves will go closed on loss of instrument air as a result of loss of AC power. Operator action is required to align the nitrogen bottles for S/G Atmospheric Relief Valve operation.

D. S/G Atmospheric Relief Valve control power is not affected by the loss of AC power.

Technical Reference(s): ONOP-IA-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5098, 1799 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

STEP / ACTION\EXPECTED RESPONSE	RESPONSE NOT OBTAINED
12. Is Unit ONLINE	**GO TO STEP 15**
13. VERIFY Instrument Air pressure greater than 90 psig and STABLE	CONTINUE attempts to restore Instrument Air **GO TO STEP 15**
14. Return to Procedure and Step in effect.	
15. Maintain steam generator level using one of the following: • Control steam generator level using main boiler feedwater pumps. between 30 and 50 % • Control steam generator level using auxiliary feedwater pumps. between 30 and 50 %	

NOTE

- Atmospheric steam dump valves fail closed on loss of instrument air.
- SOP-ESP-1 gives guidance on operation of atmospheric steam dump using nitrogen bottles.
- Nitrogen will automatically makeup to auxiliary feedwater regulators to maintain valves open as instrument air pressure decreases to 50 psig.

STEP / ACTION\EXPECTED RESPONSE	RESPONSE NOT OBTAINED
16. Monitor the N2 backup bottle pressure. • VERIFY pressure in the bottle greater than 1000 psig, (see conventional logs)	CHANGE the N2 bottles

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	057 AK3.01	
	Importance Rating	4.1	4.4

Knowledge of the reasons for the following responses as they apply to the Loss of Vital AC Instrument Bus: Actions contained in EOP for loss of vital AC electrical instrument bus.

Proposed Question: Common 50

Given the following conditions:

- The plant is at 80% power.
- A loss of Instrument Bus 31 has occurred.

Which ONE (1) of the following statements describes why the HI-HI Containment Pressure relays are blocked when performing the appropriate attachment in accordance with ONOP-EL-3?

A. Blocks inadvertent actuation of Containment Spray in the case of a redundant channel failure

B. Provides a channel trip of Containment Spray to change the coincidence to 1 out of 3 for Spray actuation

C. Makes up part of the coincidence circuitry for Spray initiation, since Containment Spray relays are energized to actuate

D. Blocks the actuation signal from the channel supplied from the de-energized instrument bus from causing an inadvertent Phase B containment isolation signal

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Relays will be deenergized on power loss

B. Incorrect. Coincidence will still be 2 of 4

C. Correct.

D. Incorrect. Not blocking initiation signal

Technical Reference(s): ONOP-EL-3 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not Available (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

JR3 CSO

ATTACHMENT 1
31 INSTRUMENT BUS (CHANNEL II, WHITE) – CONTINGENCY ACTIONS

9. WHEN VCT makeup is required, THEN DISPATCH OPERATOR to control the following, as required, to maintain VCT level:
   - Boric acid transfer pumps
   - Primary water pump
   - CH-FCV-110A, Boric Acid Blender Boric Acid Flow Control Valve
   - CH-FCV-111A, Boric Acid Blender Primary Water Flow Control Valve
   - CH-FCV-111B, Boric Acid Blender Dilution Flow Control Valve

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NOTE

Blocking the hi-hi containment spray relays:

- DOES NOT trip the spray circuit but MAKES UP one half of the coincidence circuit to initiate spray.
- WILL cause "HIGH HIGH CONTAINMENT PRESSURE (SPRAY) CHANNEL TRIP" to alarm on SBF-2, ARP entry is NOT required.

10. BLOCK hi-hi containment pressure relays as follows:
    a. INSTALL physical blocks for the following hi-hi containment pressure relays:
       - PC-948C located in Rack G-4 (SI Rack 1-1)
       - PC-949C located in Rack G-4 (SI Rack 1-1)
       - PC-948C located in Rack G-6 (SI Rack 2-1)
       - PC-949C located in Rack G-6 (SI Rack 2-1)
    b. Independently VERIFY that the following hi-hi containment pressure relays are physically blocked:
       - PC-948C located in Rack G-4 (SI Rack 1-1)
       - PC-949C located in Rack G-4 (SI Rack 1-1)
       - PC-948C located in Rack G-6 (SI Rack 2-1)
       - PC-949C located in Rack G-6 (SI Rack 2-1)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	062 AA2.01	
	Importance Rating	2.9	3.5

Ability to determine and interpret the following as they apply t the Loss of Nuclear Service Water: Location of a leak in the CCWS.

Proposed Question: Common 51

Given the following conditions:

- A normal plant cooldown is in progress.
- RHR is NOT yet in service.
- COMPONENT COOLING SURGE TANK #31 LEVEL annunciator (Panel SGF) alarms.
- Local investigation reveals no obvious cause for the problem. The level in both surge tanks is slowly decreasing.

Based on this information/indication, which ONE (1) of the following is the cause of the problem?

A. A leak exists in a RCP thermal barrier heat exchanger.

B. A tube leak exists in #31 CCW heat exchanger.

C. A tube leak exists in non-regenerative heat exchanger.

D. An excessive primary plant cooldown rate exists.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Higher pressure than CCW would cause surge tank level to rise

B. Correct.

C. Incorrect. Higher pressure than CCW would cause surge tank level to rise

D. Incorrect. Cooldown would not affect CCW surge tank volume

Technical Reference(s): ONOP-CC-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1156 (As available)

Question Source: Bank # X
Modified Bank # ____ (Note changes or attach parent)
New ____

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge ____
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 ____

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	015/017 AA1.22	
	Importance Rating	4.0	4.2

Ability to operate and/or monitor the following as they apply to the RCP malfunctions: RCP seal failure/malfunction.

Proposed Question: Common 52

The plant has been operating at steady state conditions at 100% power for the past 30 days.

Number 1 seal return flow has dropped rapidly from 3.0 GPM to O.9 GPM, and the "Reactor Coolant Pump Standpipe High Level" alarm has annunciated for RCP 31.

Which ONE (1) of the following describes the reason for these indications?

A. RCP Seal No. 1 Failure

B. RCP Seal No. 2 Failure

C. RCP Seal No. 3 Failure

D. Loss of Seal Injection flow

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Failure of #1 seal would cause leakoff to rise

B. Correct. The RCP high standpipe level in coincidence with RCP#1 seal return low flow is indicative of a number 2 RCP seal failure.

C. Incorrect. If standpipe was low, may be #3 seal failure

D. Incorrect. Even if seal injection is lost, seal flows would be provided by RCS fluid

Technical Reference(s): ONOP-RCS-5, Note on page 9 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5935 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

5V

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	(Step 7 continued from previous page)	
i.	CHECK AFFECTED RCP - 33 OR 34 1) IF 33 RCP is SECURED THEN PLACE RC-PCV-455B in Manual AND CLOSE. 2) IF 34 RCP is SECURED THEN PLACE RC-PCV-455A in Manual AND CLOSE.	**RETURN TO Plant Operating Procedure As Directed CRS Or SM**
j.	**RETURN TO Plant Operating Procedure As Directed CRS Or SM**	
8.	**CHECK RCPs No. 2 Seal:**	
a.	CHECK the following primary water to RCP standpipe valves – CLOSED • RC-AOV-553A • RC-AOV-553B • RC-AOV-553C • RC-AOV-553D	a. Manually CLOSE valve(s)
b.	CHECK SAF panel REACTOR COOLANT PUMP STANDPIPE HIGH LEVEL alarm – CLEAR	b. PERFORM the following: 1) DETERMINE affected RCP by observing RCP Standpipe Level Off Normal status lights 2) PERFORM SOP-RCS-5, REACTOR COOLANT LEAKAGE EVALUATION determine if leak rate a) IF leak rate is greater than 1.1 GPM, THEN PERFORM Emergency Shutdown of affected RCP b) IF vibrations increase, THEN PERFORM Emergency Shutdown of affected RCP

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	074 EK1.05	
	Importance Rating	2.8	3.2

Knowledge of the operational implications of the following concepts as they apply to the Inadequate Core Cooling: Definition of saturated liquid.

Proposed Question: Common 53

Given the following conditions:

- A small break LOCA has occurred.
- Due to a CSF Red Path, the team entered FR-C.1, Response to Inadequate Core Cooling, and restored Safety Injection flow
- The team is currently performing the actions in E-1, Loss Of Reactor Or Secondary Coolant
- Core exit thermocouples indicate approximately 520°F.
- RCS pressure indicates approximately 800 psig.

Which ONE (1) of the following describes the status of the Reactor Coolant System throughout this event?

A. Saturated upon entry to FR-C.1; Saturated at the present time

B. Saturated upon entry to FR-C.1; Subcooled at the present time

C. Superheated upon entry to FR-C.1; Superheated at the present time

D. Superheated upon entry to FR-C.1; Saturated at the present time

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Cannot be in FR-C.1 unless superheated.
B. Incorrect. Cannot be in FR-C.1 unless superheated. Saturated currently
C. Incorrect. Not currently superheated
D. Correct. 800 psig and 520 is approximately saturated (within 1°F)

Technical Reference(s): Steam Tables (Attach if not previously provided)

Proposed References to be provided to applicants during examination: Steam Tables

Learning Objective: 5636 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank, Previous NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	E06 EK1.3	
	Importance Rating	3.7	3.9

Knowledge of the operational implications of the following concepts as they apply to the (Degraded Core Cooling): Annunciators and conditions indicating signals, and remedial actions associated with the (Degraded Core Cooling).

Proposed Question: Common 54

Following a LOCA with subsequent ECCS failures, the crew is performing the actions in FR-C.2, Response To Degraded Core Cooling.

- o RCS pressure is rising.
- o Pressurizer Pressure High annunciator on Panel SAF is Lit
- o Core Cooling has NOT been restored

Which ONE (1) of the following describes the required operation of the Pressurizer PORVs in this event?

A. Leave closed and isolated until required to establish a vent path prior to RCP restart.

B. Verify they operate automatically or operate manually for RCS overpressure control if necessary.

C. Leave closed and isolated to prevent further loss of RCS inventory.

D. Open to depressurize the RCS to facilitate SI accumulator injection

Proposed Answer: B

Explanation (Optional):

A. Incorrect. The PORVs are not used for RCP vent paths and there is no provision in FR-C.2 for RCP restart.

B. Correct.

C. Incorrect. The PORVs are verified closed with block valves open as long as pressure is below setpoint.

D. Incorrect. This is an action possibly taken in FR-C.1.

Technical Reference(s): FR-C.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5642 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	<u>CHECK RCS Vent Paths:</u>	
	a. CHECK power to PRZR PORV block valves - AVAILABLE	a. DISPATCH NPO to restore power to the following valves: • MCC-36A - RC-MOV-536, Pressurizer PORV PCV-456 Isolation • MCC-36B - RC-MOV-535, Pressurizer PORV PCV-455C Isolation
	b. CHECK PRZR PORVs - CLOSED	b. PERFORM the following: 1) Manually CLOSE PRZR PORVs. 2) <u>IF</u> unable to close any PRZR PORV, <u>THEN</u> CLOSE its block valve.
	c. CHECK block valves - AT LEAST ONE OPEN	c. OPEN block valve unless it was closed to isolate an open PRZR PORV.
	d. CHECK Reactor vessel head vent valves - CLOSED	d. CLOSE valve(s).

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	1	1
Group #	1	1
K/A #	E07 EA1.2	
Importance Rating	3.2	3.7

Ability to operate and/or monitor the following as they apply to the (Saturated Core Cooling): Operating behavior characteristics of the facility.

Proposed Question: Common 55

What is the primary purpose of depressurizing the steam generators in response to a degraded core-cooling situation?

A. To collapse the steam voids and enhance reflux cooling in the RCS

B. To increase the primary to secondary thermal driving head for natural circulation

C. Clear the loop seal and vent steam to provide maximum cooling from the RHR pumps

D. The cooldown and depressurization of the RCS will facilitate core recovery via the SI accumulators

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Steam voids collapsed by pressurization.
B. Incorrect. Natural Circulation will not exist with a superheated RCS
C. Incorrect. RHR pumps will not be providing flow to RCS until after depressurization, and then not maximum
D. Correct. The SGs are depressurized to bring an accumulator injection and minimum RHR flow at shutoff head.

Technical Reference(s): FR-C.1 Background (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5645 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	1	1
	K/A #	076 AA2.02	
	Importance Rating	2.8	3.4

Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: Corrective actions required for high fission product activity in RCS.

Proposed Question: Common 56

Given the following conditions:

- A rapid load reduction from 100% power to 65% power was performed approximately 3 hours ago.
- R-63A and R-63B, RCS Gross Failed Fuel monitors, are in alarm.
- R-4, Charging Pump Room Area Radiation Monitor, is in alarm.
- Chemistry confirms RCS activity exceeds Technical Specification limits.

The CRS directs a plant shutdown be performed.

Which ONE (1) of the following actions is designed to limit the release of radioactivity in the event of a subsequent SGTR?

A. MSIVs are closed.

B. SG Atmospheric Dump valve setpoints are raised.

C. RCS is cooled down below 500°F.

D. Maximum Condensate Polishers are placed in service.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Closing MSIVs would contribute to rad release through SG ADVs and Safeties if cooldown and depressurization was not performed in a timely manner
B. Incorrect. ADV setpoints are normally raised in SGTR procedure

C. Correct.
D. Incorrect. Condensate polishing would help clean the secondary plant but not an action performed in accordance with the ARPs

Technical Reference(s): TS (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5472 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank. Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

C56 IP3

Number: ONOP-RCS-4	Title: HIGH RADIOACTIVITY IN REACTOR COOLANT SYSTEM	Revision Number: 8

4.0 INITIAL OPERATOR ACTIONS

4.1. Attempt to reduce coolant activity by increasing letdown flow to 120 gpm.

4.2. IF this off normal condition is due to Steps 2.1.1 or 2.1.2 THEN obtain a primary coolant sample analysis to determine gross activity.

4.3. {ITS delete}: IF the specific activity of the RCS is greater than Tech Spec limits (Sect 3.1.D), THEN the reactor shall immediately be brought to {Mode 3} hot shutdown with Tavg less than 500°F utilizing normal operating procedures (refer to POP-3.1). {ITS: REFER to Tech Spec Sect 3.4.16 and implement Action Statement as required.}

Deleted: delete

Deleted: 3.1.D), THEN the reactor shall immediately be brought to {Mode 4} . {ITS delete} hot shutdown with Tavg less than 500°F . utilizing normal operating procedures (refer to POP-3.1). .

Deleted: IF the specific activity of the RCS is greater than

Deleted: limits (

Deleted: ;

Deleted: THEN the reactor shall immediately be brought to hot shutdown with Tavg less than 500□F utilizing normal operating procedures (refer to POP-3.1)

5.0 SUBSEQUENT ACTIONS

5.1. IF the activity on R-63 is greater than 5 μCi/cc but less than 50 μCi/cc, THEN have the health physics technician assist the chemist in primary sampling.

5.2. IF the activity on R-63 exceeds 50 μCi/cc, THEN consideration should be given to using the Post Accident Sampling System. Health Physics or Chemist and Radiological Engineering should be consulted for sampling requirements.

5.3. Have Chemist assist in determining the cause of the increased activity.

5.4. Have Health Physics monitor for increasing radiation fields in the controlled area.

5.5. IF reactor coolant gamma activity continues to increase, as shown by R-63A and B (G.F.F. Monitors), THEN place the CVCS demineralizers in service per chemistry recommendations.

5.6. Based on Chemistry's analysis:

5.6.1. IF failed fuel is indicated, THEN place the cation demineralizer in service per SOP-CVCS-4 and remove fission gases from the coolant via the VCT per SOP-CVCS-4 and SOP-CVCS-7.

5.6.2. IF a crud burst is indicated, THEN attempt to reduce the activity using the inservice mixed bed demineralizer. If the inservice bed is unable to reduce the activity, place the standby mixed bed in service per SOP-CVCS-4.

5.6.3. IF a large crud burst in indicated, THEN bypass the demineralizers and clean-up the RCS using the reactor coolant filter per SOP-CVCS-4.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	001 AA1.05	
	Importance Rating	4.3	4.2

Ability to operate and/or monitor the following as they apply to the Continuous Rod Withdrawal: Reactor trip switches

Proposed Question: Common 57

Given the following conditions:

- The plant is at 100% power.
- All control systems are operating in their normal alignments
- Tavg and Tref are matched and stable
- Control Bank D begins stepping out at a rate of 8 steps per minute.
- The CRS directs entry to ONOP-RC-2, Rod Control System Malfunction

Which ONE (1) of the following conditions will require initiation of a manual reactor trip in accordance with ONOP-RC-2?

A. Rod motion continues beyond actuation of the OT Delta T rod stop

B. Any control rod drop during the rod motion

C. Rod motion continues with the bank selector switch in MANUAL or BANK SELECT

D. Rod motion continues beyond actuation of any Power Range High Flux Rod Stop

Proposed Answer: C

Explanation (Optional):

A. Incorrect. May have already gone past. Not a requirement
B. Incorrect. One dropped rod does not require a trip.
C. Correct
D. Incorrect. Beyond rod stop not required. Only after moving selector switch

Technical Reference(s): ONOP-RC-2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5117, 5251 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

JP3/5/7

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.0	**INITIAL OPERATOR ACTIONS**	
1.	**PLACE Control Rods - IN MANUAL OR BANK SELECT**	
	a. VERIFY Rod motion has stopped	a. Manually TRIP the Reactor and **Go To E-0, Reactor Trip Or Safety Injection**
	b. Stop any operation that requires rod movement or caused a rod stop to be initiated.	
2.	**Check to see if the Reactor should be shutdown:**	
	a. VERIFY less than 2 Control Rods DROPPED	a. Manually TRIP the Reactor and **Go To E-0, Reactor Trip Or Safety Injection**
	b. VERIFY Turbine/Generator ON-LINE	b. IF a dropped rod is indicated THEN Manually insert all control and shutdown banks. 1) CONTACT Reactor Engineering, 2) Initiate Repairs **3) Exit this procedure**
3.	**MAINTAIN RCS Tavg:** a. CHECK Tavg within 1.5°F of Tref.	ADJUST Tavg using one or more of the following: • Control Rods in MANUAL • Boron concentration • Turbine load

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	003 AK2.05	
	Importance Rating	2.5	2.8

Knowledge of the interrelations between the Dropped Control Rod and the following: Control rod drive power supplies and logic circuits.

Proposed Question: Common 58

Given the following conditions:

- The plant is at 100% power.
- All control systems are in their automatic alignments
- The following annunciator is received on Panel SBF
  - Rod Control Non-Urgent Failure
- Investigation determines that a failure of a redundant power supply in Power Cabinet 2AC is the cause of the alarm.
- Rod Control is placed in Manual per the ARP

If the other redundant power supply to Power Cabinet 2AC were to fail, which ONE (1) of the following conditions would result?

A. Rods controlled by Power Cabinet 2AC would drop

B. All rod motion by rods controlled by Power Cabinet 2AC would be frozen

C. The Bank Overlap Unit would reset to zero

D. One reactor trip breaker would lose control power and the reactor would trip

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. No power, rods will drop

C. Incorrect. BOU would not reset on power cabinet failure. BOU is manually set

D. Incorrect. Different power supplies

Technical Reference(s): ARP SBF (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0862 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

AR3
C5A

INPUT DEVICE:	Internal electronics coincident with failure of solid state cards
SETPOINT:	Loss of redundant power supply

ROD CONTROL
NON
URGENT
FAILURE

1.0 CAUSES

1.1 Failure of a redundant power supply to the logic cabinet.

1.2 Failure of a redundant power supply to a power cabinet.

2.0 AUTOMATIC ACTIONS

None

3.0 SUBSEQUENT ACTIONS

3.1 IF Bus 5A is deenergized, THEN GO TO ONOP-EL-7, Loss of a 480V Bus - Above Cold Shutdown.

CAUTION

Rods SHALL NOT be moved until the cause of the alarm is determined. Loss of power may affect moving coil thyristor gating which may result in the affected rods dropping into the core on outward motion demand.

3.2 PLACE Rod Control Bank Selector Switch in MAN.

3.3 STOP any evolution that may cause a power level change.

3.4 CONTROL Turbine load AND Boron concentration to maintain Tavg within 1.5°F of Tref per applicable plant operating procedure.

3.5 DISPATCH an NPO to verify alarm and check local cabinets for an illuminated P.S. supply or Non urgent amber alarm light to determine the affected cabinet.

(CONTINUED ON THE NEXT PAGE)

NOTE

- Full Length Rod Control System technical manual (439-100000285, Volume 3, Chapter 3, Section 3, Maintenance) provides information for troubleshooting this alarm.
- WHEN the power supply is restored, THEN the non-urgent alarm will automatically reset.

3.6 DIRECT I&C to investigate cause of alarm and make necessary repairs.

3.7 WHEN repairs are complete, THEN PLACE Rod Control Bank Selector Switch in AUTO.

4.0 REFERENCES

4.1 Drawing 5651D74

4.2 Elementary Wiring Diagram 500B971, Sht. 158

4.3 439-100000285, Volume 3, Full Length Rod Control System

4.4 ONOP-EL-7, Loss of a 480V Bus - Above Cold Shutdown

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	008 AK2.02	
	Importance Rating	2.7	2.7

Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the following: Sensors and detectors.

Proposed Question: Common 59

Given the following conditions:

- Pressurizer pressure is 985 psig
- Pressurizer Relief Tank pressure is 5 psig
- PRT temperature is 90°F
- The reactor is shut down

If a pressurizer safety valve begins to leak, which ONE (1) of the following is the temperature seen downstream of the leaking valve?

A. 230°

B. 300°

C. 340°

D. 550°

Proposed Answer: B

Explanation (Optional):

A. Incorrect.

B. Correct. Approximate BTU/LBM for PRZR saturation would be actual value of 1195. In this case, constant enthalpy (throttling) process, mollier line to 20 psia, temperature is approximately 300°F (Superheat)

C. Incorrect.

D. Incorrect.

Technical Reference(s): Steam Tables (Attach if not previously provided)

Proposed References to be provided to applicants during examination: Steam Tables

Learning Objective: Not available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	2
	Group #	2	1
	K/A #	009 EA1.18	
	Importance Rating	3.4	3.2

Ability to operate and monitor the following as they apply to a small break LOCA: Balancing of HPI loop flows.

Proposed Question: Common 60

Given the following conditions:

- Reactor trip and safety injection have occurred.
- RCS pressure is 450 psig and stable
- Containment pressure is 0.7 psig and rising

If the break is at the SI Cold Leg discharge line connection to loop 31, which ONE (1) of the following describes the SI flow indication in the CCR?

A. SI flow indication is approximately equal in all 4 loops. RHR flow is zero in all 4 loops.

B. SI flow and RHR flow to loop 31 is off-scale high. SI flow to loops 32, 33, 34 is reduced. RHR flow to loops 32, 33, 34 is zero.

C. SI flow is zero to loop 31. SI flow to loops 32, 33, 34 is elevated. RHR flow is zero to all 4 loops.

D. SI flow to loop 31 is off-scale high. SI flow to loops 32, 33, 34 is reduced. RHR flow to all loops is zero.

Proposed Answer: A

Explanation (Optional):

A. Correct. At higher SI flow rates such as at 450 psig, the SI discharge lines are throttled to ensure even distribution of flow to loops
B. Incorrect. Pressure too high for RHR and SI would not be off-scale due to throttled line
C. Incorrect. At connection to loop, flow will be going through SI line

D. Incorrect. Throttled on discharge

Technical Reference(s): SI LP (Attach if not previously provided)
SD-10.1

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0192.a (As available)

Question Source: Bank # ______
Modified Bank # ______ (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge ______
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

IP3
C60

(13) A second line is installed to provide a thrust on the single sided thrust bearing to ensure that if floating occurs the shaft directs its thrust to a bearing surface vice a non-bearing surface

(14) High head discharge pressure is monitored by PT-922 and 923 and provides indication on the safeguards panel

(15) Relief valve 855 is installed to protect the high head injection lines from overpressurization E.O. 1

(a) It relieves at 1575 psig to the PRT with a capacity of 15 gpm

(b) Overpressure can be caused by inleakage of reactor coolant or by thermal expansion caused by temperature changes of the water in the lines

(16) Each injection header splits into 5 supply lines, four cold legs and one hot leg

(a) Each supply line contains an isolation valve and two check valves

i) The cold leg valves, 856A,C,D,E,F,H,J,K are normally open

a) Even though the valves are open they still receive a SI open signal

ii) They are throttled to maintain equal flow to all of the loops. They are restricted from fully opening by mechanical stops

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	011 EA1.01	
	Importance Rating	3.7	3.8

Ability to operate and monitor the following as they apply to a Large Break LOCA: Control of RCS pressure and temperature to avoid violating PTS limits.

Proposed Question: Common 61

Given the following conditions:

- The reactor has tripped. Safety Injection and Containment Spray have actuated.
- The team is performing the actions of E-1, Loss of Reactor or Secondary Coolant
- RCS pressure is 20 psig.
- RHR flow is 3000 gpm.
- Containment Sump level is rising rapidly.
- SG pressures are approximately 680 psig and stable.
- A Red Path exists on the Integrity Status Tree
- The CRS directs transition to FR-P.1, Response to Imminent Pressurized Thermal Shock
- The procedure immediately sends the team back to E-1

Based on the above plant conditions which ONE (1) of the following states the reason for the procedure transition from FR-P.1 back to E-1?

A. The RCS cooldown and pressure reduction performed in FR-P.1 are not required during a Large Break LOCA.

B. A Small Break LOCA has priority over Pressurized Thermal Shock concerns.

C. Faulted SG isolation must occur prior to transition to a Functional Recovery Procedure.

D. Since Safety Injection cannot be terminated, FR-P.1 provides an immediate transition back to E-1.

Proposed Answer: A

Explanation (Optional):

A. Correct
B. Incorrect. SBLOCA is a concern for PTS
C. Incorrect. Not reason for this procedure transition
D. Incorrect. Wrong reason for transition back

Technical Reference(s): FR-P.1 Basis Document (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5776 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	1
	K/A #	E01 EK3.2	
	Importance Rating	3.0	3.9

Knowledge of the reasons for the following responses as they apply to the Reactor Trip or Safety Injection/Rediagnosis: Normal, abnormal and emergency operating procedures associated with (Reactor Trip or Safety Injection/Rediagnosis).

Proposed Question: Common 62

Procedure ES-0.0, "REDIAGNOSIS" is implemented...

A. at the discretion of the CRS anytime during the performance of the Emergency Operating Procedures.

B. when directed to do so according to criteria listed on the foldout page of the current procedure in effect.

C. only after transition out of E-0 has occurred when Safety Injection has been actuated.

D. at the discretion of the CRS, but only after completion of a Functional Restoration Procedure.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. SI required

B. Incorrect. No ES-0.0 criteria on foldout pages

Technical Reference(s): ES-0.0 (Attach if not previously provided)
EOP User's Guide

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5392 (As available)

Question Source:	Bank #	X	
	Modified Bank #		(Note changes or attach parent)
	New		

Question History: Facility Bank

Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41	X
	55.43	

Comments:

W2

(a) POP

(b) To appropriate POP while on RHR at cold shutdown

(c) RHR operations at cold shutdown conditions or on either cold or hot leg recirculation with longer term recovery actions being determined.

7. Special Procedures

a. ES-0.0 (Rediagnosis) EO - 17 (5392)

(1) Provides guidance to ensure proper transitioning through the EOP network (determine or confirm most appropriate post action recovery procedure)

(2) Not to be use as substitute or interfere with proper transitioning through EOPs

b. RO-1 (BOP Actions during use of EOPs) EO - 15 (5390)

(1) Procedure designed to reduce the work load of CRS by assigning specific responsibilities to BOP which include:

(a) Addressing alarms received during event.

(b) Verifying automatic action initiated by SI signal

(c) Perform BOP operations

(d) Control Board "clean-up" realignment

(2) Entered by direction of CRS

(3) Exited at:

(a) End of R0-1, or

(b) When SI not actuated, or

(c) When ES-1,1 (SI Termination) is initiated.

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	1	1
Group #	2	2
K/A #	022 AA1.08	
Importance Rating	3.4	3.3

Ability to operate and/or monitor the following as they apply to the Loss of Reactor Coolant Pump Makeup: VCT level.

Proposed Question: Common 63

Assuming no operator actions are taken, which ONE of the following describes the plant conditions following VCT level channel LT-112 failure HIGH?

A. Increasing VCT level and letdown diverted to the HUT.

B. Decreasing VCT level and loss of NPSH to the charging pumps.

C. Increasing VCT level and continuous makeup from the blender to the VCT.

D. Decreasing VCT level and auto swapover of the charging pump suction to the RWST.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. No increasing level because makeup will not actuate. Level will decrease because of divert
B. Correct.
C. Incorrect. No increasing level and makeup is disabled
D. Incorrect. No swapover because transmitter is failed high

Technical Reference(s): ONOP-CVCS-2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5118 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	1	1
Group #	2	2
K/A #	025 AA2.07	
Importance Rating	3.4	3.7

Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Pump cavitation.

Proposed Question: Common 64

Given the following conditions:

- RHR is in service at Reduced Inventory conditions.

Which ONE (1) of the following indications are used to determine if cavitation is occurring?

A. RHR flow and pump amps increasing as RCS inventory is raised.

B. RHR flow and pump discharge pressure oscillations.

C. RHR pump discharge pressure and RVLIS Full Range level oscillations.

D. RHR flow high coincident with RVLIS Full Range level low.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Description of inventory restoration, not cavitation
B. Correct.
C. Incorrect. RVLIS not used in RIO
D. Incorrect. RVLIS not used but describes a condition that could potentially lead to cavitation

Technical Reference(s): SD-4.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # Vendor Bank
Modified Bank # (Note changes or attach parent)
New

Question History: Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	054 G2.4.2	
	Importance Rating	3.9	4.1

Emergency Procedures/Plan: Knowledge of system setpoints, interlocks, and automatic actions associated with EOP entry conditions.

Proposed Question: Common 65

Given the following conditions:

- RCS pressure is 1000 psig and trending down.
- Safety Injection has actuated.
- 31 SG NR level is 5% and trending down, pressure is 500 psig and trending down slowly.
- 32 SG NR level is 7% and trending down, pressure is 480 psig and trending down slowly.
- 33 SG NR level is 3% and trending down, pressure is 490 psig and trending down slowly.
- 34 SG NR level is 3% and trending down, pressure is 500 psig and trending down slowly.
- Total AFW flow is 180 GPM
- Containment pressure is 4 psig and rising.
- The team is preparing to transition from E-0, Reactor Trip or Safety Injection.

Which ONE (1) of the following procedures will be entered under these conditions?

A. E-2, Faulted Steam Generator Isolation.

B. FR-H.1 Response to Loss of Secondary Heat Sink.

C. FR-H.5, Response to Steam Generator Low Level.

D. ECA-1.2, Uncontrolled Depressurization of All Steam Generators.

Proposed Answer: B

Explanation (Optional):

A- Incorrect. Not RED, and not an FR

B- Correct. Entry met for FR-H.1, not enough AFW or SG level

C- Incorrect. Not RED. Yellow path procedure

D- Incorrect. Not RED, and not an FR

Technical Reference(s): FR-H.1 Entry Conditions (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 3673 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank
Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

65

Number:	Title:	Revision Number:
E-0	REACTOR TRIP OR SAFETY INJECTION	17

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
5.	<u>CHECK AFW Status:</u>	
	a. VERIFY total AFW flow - GREATER THAN 365 GPM	a. PERFORM the following: 1) Manually START available pump(s). 2) ALIGN valves as required. 3) <u>IF</u> cutback controller is malfunctioning, <u>THEN</u> ATTEMPT manual control. 4) <u>IF</u> all SG NR levels are less than 9% [14%] <u>AND</u> total AFW flow can <u>NOT</u> be maintained greater than 365 gpm, <u>THEN</u> GO To FR-H.1, RESPONSE TO LOSS OF SECONDARY HEAT SINK.
	b. CONTROL feed flow to maintain SG NR levels between 9% [14%] and 50%	

<u>CAUTION</u>

STARTING OF EQUIPMENT MUST BE COORDINATED WITH ALL CONTROL ROOM OPERATORS TO ENSURE THAT TWO COMPONENTS ARE <u>NOT</u> STARTED AT THE SAME TIME ON THE SAME POWER SUPPLY.

6. * <u>DIRECT BOP Operator to PERFORM RO-1, BOP OPERATOR ACTIONS DURING USE OF EOPS</u> *

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	3	2
	K/A #	065 G2.1.2	
	Importance Rating	3.9	4.0

Conduct of operations: Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: Common 66

Given the following conditions:

- The plant is at 100% power.
- A Loss of Instrument Air pressure has occurred
- The CRS has directed entry to ONOP-IA-1, Loss of Instrument Air

Which ONE (1) of the following plant conditions will require a reactor trip in accordance with ONOP-IA-1?

A. Instrument Air pressure cannot be maintained above 60 psig

B. Essential Service Water header pressure indicates less than 60 psig

C. Loss of 31, 32, and 33 Instrument Air Compressors

D. Loss of Charging Pump Speed Control

Proposed Answer: A

Explanation (Optional):

A. Correct
B. Incorrect. Procedure requires check, but no trip
C. Incorrect. Checks running but no trip required
D. Incorrect. Sends NPO to run Charging if speed control lost

Technical Reference(s): ONOP-IA-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5099 (As available)

Question Source: Bank #

Modified Bank # (Note changes or attach parent)

New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X

Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X

55.43

Comments:

R3 C66

STEP	ACTION\EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4.0 INITIAL OPERATOR ACTIONS

STEP	ACTION\EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	**VERIFY Instrument Air pressure GREATER than 90 psig and stabel or increasing**	**IF Instrument Air pressure drops below 60 THEN trip the reactor and GO TO E-0. Continuing to perform this procedure in parallel.**
2.	**CHECK Pressurizer NOT water solid**	Trip the charging pumps.
3.	**DIRECT NPO to start or attempt to re-start the following equipment or auxiliaries, if not already running:** • 31-33 Instrument Air Compressors • Station Air Compressor • Ingersoll Rand Diesel Air Compressor • Admin Air Compressors	REQUEST ConEdison to supply air via Unit 2 to Unit 3 Instrument Air Crosstie Valve.

5.0 SUBSEQUENT ACTION

STEP	ACTION\EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	**DISPATCH personnel to attempt to locate and isolate leakage**	
5.	**VERIFY Essential Service Water pressure greater than 60 psig**	START additional Service Water Pumps as required.
6.	**Direct NPO to attempt to restore Instrument Air pressure as follows:** • CHECK NORMAL ΔP across IA Dryers and Filters • VERIFY proper IA alignment	CHECK System alignment and realign or bypass as required.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	2	2
	K/A #	058 AA2.03	
	Importance Rating	3.5	3.9

Ability to determine and interpret the following as they apply to the Loss of DC Power: DC loads lost. Impact on ability to operate and monitor plant systems.

Proposed Question: Common 67

Given the following conditions:

- The plant is in Mode 3.
- 31 and 33 Auxiliary Boiler Feed Pumps (ABFPs) are in service feeding all 4 SGs.
- 125 VDC control power to the 33 ABFP is lost.

Which ONE (1) of the following describes the effect on the operation of 33 ABFP?

A. Breaker indication in CCR is lost
CCR breaker control is lost
Pump will trip

B. Breaker indication is available
CCR breaker control is lost
Pump will trip

C. Breaker indication in CCR is lost
CCR breaker control is lost
Pump remains running

D. Breaker indication in CCR is available
CCR breaker control is lost
Pump will remain running

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Pump will not trip

B. Incorrect. Breaker indication lost

C. Correct

D. Incorrect. Breaker indication lost

Technical Reference(s): ONOP-EL-5 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0277 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	1	1
Group #	2	2
K/A #	061 AA1.01	
Importance Rating	3.6	3.6

Ability to operate and/or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Automatic actuation.

Proposed Question: Common 68

Which of the Area Radiation Monitors (ARMs) has an automatic action (other than an alarm) when the alarm setpoint is reached?

A. R-2 Vapor Containment ARM

B. R-5 Fuel Storage Building ARM

C. R-7 Incore Instrumentation Room ARM

D. R-4 Charging Room ARM

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Alarm only
B. Correct
C. Incorrect. Alarm only
D. Incorrect. Alarm only

Technical Reference(s): RDM-L0306 (Attach if not previously provided)
SD-12

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5043 (As available)

Question Source: Bank # X
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ______

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

IP3
C68

i) Normally lit

ii) Off for circuit problem

iii) Depressed to expose check source to detector

(b) Red "High High Alarm / Reset"

i) Lit on alarm

ii) Depressed to reset alarm

(c) Amber "High Alarm / Reset"

i) Lit on alert

ii) Depressed to reset alert

e. Annunciator Panel (ARP-30)

1. Acknowledge, Reset, & Test pushbuttons

6. RM-80 Room

a. Located on 55' PAB across from Drumming Station — EO 11

b. Contains 19 RM-80 panels

(1) 10 of them are ARMs

c. RM-80s covered in detail in LIC-RDM-05

7. Automatic Actions on ARM Alarms

a. Control Room ARM (R-1) switches CCR A/C to 10% Incident Mode — EO 5

(1) Starts recirculation

(2) Starts charcoal filtering

b. Fuel Storage Building ARM (R-5) switches FSB ventilation to Emergency Mode — EO 5

(1) Stops supply fan and thereby closes intake dampers

(2) Starts exhaust fan

(3) Shuts sliding door

(4) Supplies air to door seals

(5) Opens charcoal filter inlet and outlet face dampers

Note: prior to FSB activities, filter bypass panel assemblies are installed that divert exhaust flow through the charcoal filter

c. TSC HVAC ARM (R-44A) switches TSC ventilation to Emergency Mode — EO 5

(1) Starts recirculation

(2) Starts charcoal filtering

d. TSC Outside ARM (R-44B) also switches TSC ventilation to Emergency Mode — EO 5

E. System Operation

1. SOP-RM-1, Area Radiation Monitoring, applies to ARM's on D-1, D-11, CP-4, and CP-42

2. Precautions and Limitations

a. Do not operate the check source for more than 30 seconds and allow 1 minute cooling time between operations

(1) May result in damage to the check source solenoid

b. When testing radiation monitors with the check source, the automatic actions associated with that channel may be initiated

c. When inserting or removing fuses in racks D1, D2, or D3 a voltage spike on the associated instrument bus may occur — Operator Aid

3. Startup

a. Energizing the Area Radiation Monitoring Panel D-1 — EO 8

(1) Close circuit breaker No. 18 on Instrument Bus Panel No. 32

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	1	1
Group #	2	2
K/A #	038 EK3.01	
Importance Rating	4.1	4.3

Knowledge of the reasons for the following responses as they apply to the Steam Generator Tube Rupture: Equalizing pressure on primary and secondary sides of ruptured SG.

Proposed Question: Common 69

Given the following conditions:

- A Steam Generator Tube Rupture has occurred.
- The team is performing actions contained in E-3, Steam Generator Tube Rupture.

Which ONE (1) of the following describes the reason for reducing RCS pressure to match ruptured SG pressure in E-3?

A. To eliminate concern for SG overfill and damage to secondary side steam piping.

B. To restore RCS inventory and reduce break flow prior to stopping ECCS pumps.

C. To minimize the probability of a Pressurized Thermal Shock event when RCS cooldown is commenced.

D. To ensure there will be no release of radioactivity through the SG Atmospheric Dump valves for the duration of the SGTR.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. May not be able to stop overfill if release is large enough
B. Correct
C. Incorrect. PTS is only a concern if ruptured SG pressure is low. (Also faulted)
D. Incorrect. May not be able to stop release if SGTR is large enough

Technical Reference(s): E-3 Basis Document (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5708 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank
Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	3	3
	K/A #	028 AK3.02	
	Importance Rating	2.9	3.2

Knowledge of the reasons for the following responses as they apply to the Pressurizer Level Control Malfunctions: Relationships between PZR pressure increase and reactor makeup/letdown imbalance.

Proposed Question: Common 70

Given the following conditions:

- The plant is at 100% power. All control systems are in automatic.
- Steady state conditions exist.
- The controlling pressurizer level channel, LT-460, slowly fails high.

Without operator action, which ONE (1) of the following describes the response of charging and letdown?

A. Charging flow will decrease due to the level channel failure, and the letdown isolation valve, LCV-460, will close.

B. Charging flow will decrease due to the level channel failure, and the letdown isolation valve, LCV-459, will close.

C. Charging flow will increase due to the level channel failure, and the letdown isolation valve, LCV-460, will close.

D. Charging flow will increase due to the level channel failure, and the letdown isolation valve, LCV-459, will close.

Proposed Answer: A

Explanation (Optional):

A. Correct. Level channel fails high will cause backup heaters to turn on. No action, backup channel will go low, causing 460 closure
B. Incorrect. RCS pressure rises.
C. Incorrect. Charging flow drops as indicated level rises

D. Incorrect. Charging flow drops as indicated level rises

Technical Reference(s): ONOP-RPC-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0901 (As available)

Question Source: Bank # ______
Modified Bank # ______ (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge ______
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	1
	Group #	3	3
	K/A #	056 AA2.51	
	Importance Rating	3.3	3.4

Ability to determine and interpret the following as they apply to the Loss of Offsite Power: _T, (core, heat exchanger, etc.)

Proposed Question: Common 71

Given the following conditions:

- The plant was at 100% power, BOL
- A loss of off-site power has occurred
- Subsequently, a loss of CCW required a reactor trip and a trip of all RCPs

Which ONE (1) of the following describes the response of the reactor core ΔT from the time the RCPs are tripped until one hour later in the event?

Core ΔT...

A. Rises as natural circulation is being established, then remains constant as heat removal is established with the atmospheric steam dumps

B. Rises as natural circulation is being established, then lowers as decay heat load diminishes and heat removal is controlled by the atmospheric steam dumps

C. Lowers as natural circulation is being established, then remains constant as heat removal is established with the atmospheric steam dumps

D. Lowers as natural circulation is being established, the rises as decay heat load diminishes and heat removal is controlled by the atmospheric steam dumps

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Does not take decay heat into account
B. Correct

C. Incorrect. Delta T has to become higher to establish a driving head for natural circulation

D. Incorrect. Delta T has to become higher to establish a driving head for natural circulation. Distractor provides opposite of actual effect

Technical Reference(s): Thermo (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	032 AA2.04	
	Importance Rating	3.1	

Ability to determine and interpret the following as they apply to the Loss of Source Range Instrumentation: Satisfactory Source Range/Intermediate Range overlap.

Proposed Question: RO 72

Given the following conditions:

- A reactor startup is in progress.
- Intermediate Range N35 and N36 indicate approximately $3X10^{-11}$ amps and rising at approximately 0.2 DPM

Which ONE (1) of the following states the approximate indication on Source Range channels N31 and N32?

A. 10^2 CPS

B. 10^3 CPS

C. 10^4 CPS

D. 10^5 CPS

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Too low
B. Incorrect. Too low, IR on scale at 10^{-11} amps which corresponds to approximately $5X10^3$ CPS
C. Correct
D. Incorrect. SR Trip on high flux

Technical Reference(s): SD-13 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0810 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

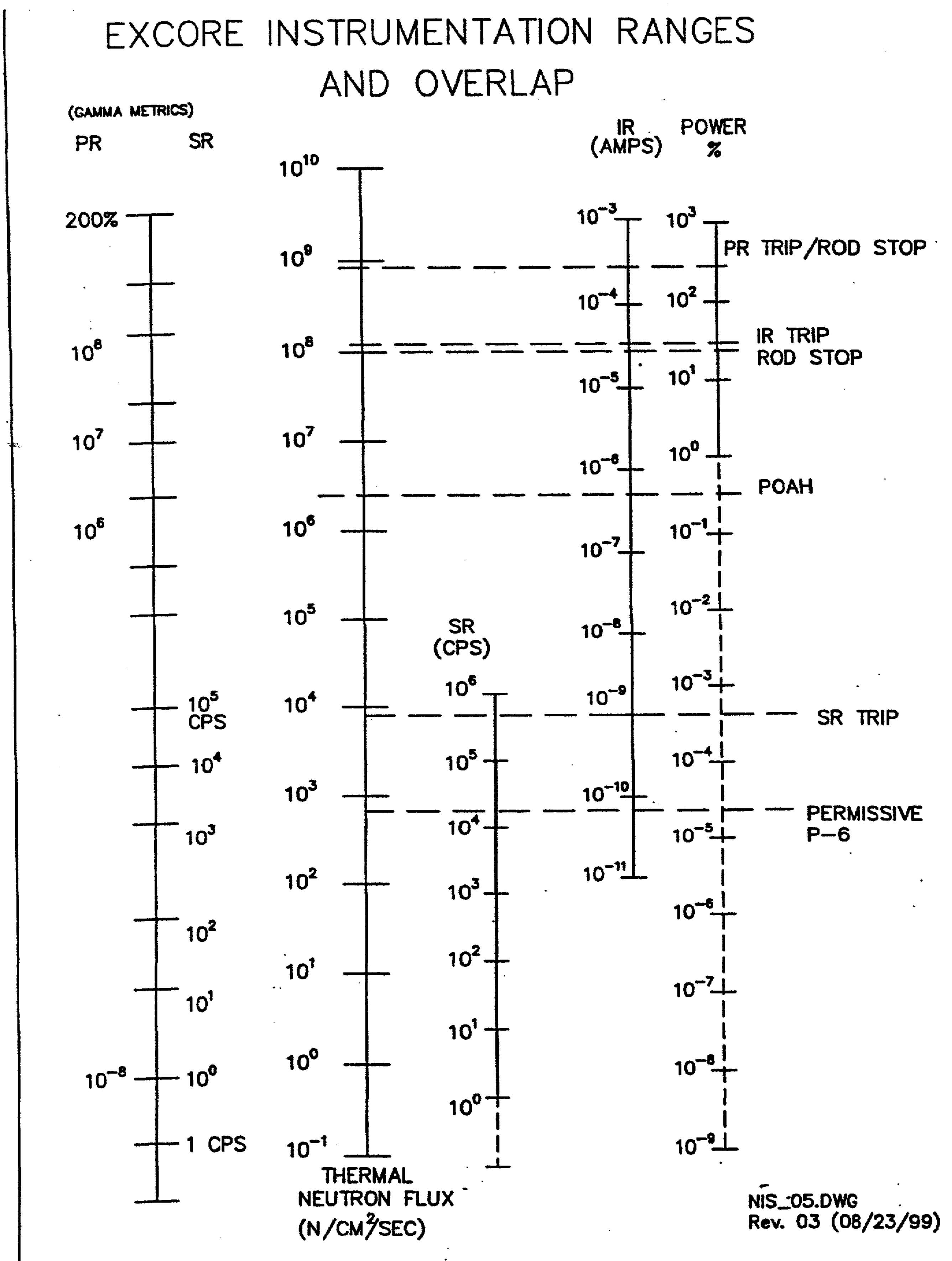

Figure 13-4: Instrumentation Ranges and Overlap (NIS-05)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	054 G2.2.25	
	Importance Rating		3.7

Equipment control: Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.

Proposed Question: SRO 72

Which ONE (1) of the following describes the design basis of the AFW system?

With the Condensate Storage Tank (CST) at the minimum level required by Technical Specifications,

A. Any one AFW pump can remove decay heat for 24 hours in Hot Standby following a loss of off-site power

B. Any two AFW pumps can remove decay heat for 24 hours in Hot Standby following a loss of all AC power

C. Any one AFW pump can remove decay heat for 72 hours in Hot Standby following a loss of off-site power

D. Any two AFW pumps can remove decay heat for 72 hours in Hot Standby following a loss of all AC power

Proposed Answer: A

Explanation (Optional):

A. Correct
B. Incorrect. Only 1 necessary
C. Incorrect. Not 72 hours
D. Incorrect. Not 72 hours and only 1 necessary

Technical Reference(s): TS 3.7.5 and basis (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) item 1 and 2 because it is design basis, and TS basis for system operability

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BASES

BACKGROUND (continued)

The AFW System is capable of supplying feedwater to the steam generators during normal unit startup, shutdown, and hot standby conditions.

The turbine driven AFW pump supplies a common header capable of feeding all steam generators. Each of the steam generators can also be supplied by one of the two motor driven AFW pumps. Any of the three pumps at full flow is sufficient to remove decay heat and cool the unit to residual heat removal (RHR) entry conditions. Thus, the requirement for diversity in motive power sources for the AFW System is met.

The AFW System is designed to supply sufficient water to the steam generator(s) to remove decay heat with steam generator pressure at the setpoint of the MSSVs. Subsequently, the AFW System supplies sufficient water to cool the unit to RHR entry conditions, with steam released through the ADVs.

The motor driven pumps are actuated by any one of the following:

1) Low-low level in any steam generator;

2) Loss of voltage (Non SI blackout) on 480 VAC bus 2A/3A (starts AFW Pump 31) and loss of voltage (Non SI blackout) on 480 VAC bus 6A (starts AFW Pump 33);

3) Safety Injection signal;

4) Auto trip of either main boiler feed pump;

5) Manual actuation from the Control Room; and

6) Manual actuation locally at the pump room.

The steam turbine driven pump is actuated by any one of the following:

1) Low-low level in two of the four steam generators;

2) Loss of voltage (Non SI blackout) on 480 VAC busses 2A/3A or 6A;

(continued)

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B 3.7 PLANT SYSTEMS

B 3.7.7 City Water (CW)

BASES

BACKGROUND

City Water is the backup to the Condensate Storage Tank (CST) as a water supply for the Auxiliary Feedwater System. The CST, the preferred source of water for the Steam Generators (SGs), is capable of holding up to 600,000 gallons and is sized to meet the normal operating and maintenance needs of the main steam system. LCO 3.7.6, Condensate Storage Tank, requires that a minimum water level is maintained in the CST that is sufficient to remove residual heat for 24 hours at hot shutdown conditions following a trip from full power. Only when the CST supply is exhausted or not available will city water be used to supply the Auxiliary Feedwater System.

When the main steam isolation valves are open, the preferred means of heat removal from the RCS is to discharge steam to the condenser via the non-safety grade turbine steam bypass valves (High Pressure Steam Dump) with water supplied from the CST to the SGs using the AFW System. The condensed steam is returned to the CST by the condensate pump. This configuration conserves condensate and minimizes releases to the environment. The CST is the preferred source of water for the SGs.

When the CST supply is exhausted, city water is used to supply the Auxiliary Feedwater System for decay heat removal and plant cooldown. CW, although aligned to the IP3 site, is normally isolated from the AFW pump suctions.

The City Water System includes the site city water header consisting of the 1.5 million gallon city water storage tank and the connection to the offsite water supply. A description of the CW system is found in FSAR, Section 10 (Ref. 1).

(continued)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	001 K4.02	
	Importance Rating	3.8	

Knowledge of CRDS design feature(s) and/or interlock(s) which provide for the following: Control rod mode select control (movement control).

Proposed Question: RO 73

An Urgent Failure has occurred in the 1BD Power Cabinet.

Which ONE (1) of the following describes rod control capability from the Control Room?

A. All rod motion is inhibited.

B. All Bank D rods will move in MANUAL or INDIVIDUAL BANK SELECT mode.

C. All Bank B and D rods will move only in INDIVIDUAL BANK SELECT mode.

D. Bank D Group 2 rods will move only in INDIVIDUAL BANK SELECT mode.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. May be moved in bank select
B. Incorrect. Cannot move in manual
C. Incorrect. Bank 1 will not move
D. Correct.

Technical Reference(s): SD-16.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0862 (As available)

Question Source: Bank # X
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge ______
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	001 A2.03	
	Importance Rating		4.2

Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Effect of stuck rod or Misaligned rod.

Proposed Question: SRO 73

The Unit is at 91% power.

Control Bank "D" Group 1 indicates the following:

- Group step counter position is 180 steps.
- DRPI indicates the following:
  - Control Rod F02 at 178 steps
  - Control Rod B10 at 191 steps
  - Control Rod K14 at 166 steps
  - Control Rod P06 at 164 steps

Which ONE (1) of the following describes the action(s) required by Technical Specifications and ONOP-RC-1, Dropped or Misaligned Rod?

A. Immediately trip the reactor and emergency borate the RCS.

B. Reduce thermal power to less than 80% within 1 hour and restore both control rods to within alignment within 2 hours, or borate to Hot Standby conditions within the following 6 hours.

C. Restore both control rods to within alignment in 2 hours or be in Hot Standby within the following 6 hours.

D. Verify Shutdown Margin within 1 hour and be in Hot Standby within 6 hours

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Reactor trip is not required.
B. Incorrect. A full shutdown is required immediately with multiple misalignments.
C. Incorrect. Required to be in Mode 3 in 6 hrs. No grace period for realignment.
D. Correct.

Technical Reference(s): Tech Specs (Attach if not previously provided)
ONOP-RC-1

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1946 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank. Previous NRC exam

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments: 10CFR55.43(b) item 2 because the SRO must determine action IAW Technical

IP3 5/13

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B (continued)	B.2.6 Re-evaluate safety analyses and confirm results remain valid for duration of operation under these conditions.	5 days
C. Required Action and associated Completion Time of Condition B not met.	C.1 Be in MODE 3.	6 hours
D. More than one rod not within alignment limit.	D.1.1 Verify SDM is within the limits specified in the COLR. OR D.1.2 Initiate boration to restore required SDM to within limit. AND D.2 Be in MODE 3.	1 hour 1 hour 6 hours

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

5.0 SUBSEQUENT ACTION

	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	**CHECK For a misaligned Control Rod** a. VERIFY Affected Rod indicating greater than 20 steps on the IRPI	REDUCE Reactor Power to Less than 75% power and maintain Tavg within 1.5 F of Tref by any of the following: {ITS 3.1.4} • Automatic Rod Control • IF necessary THEN place control rods in MANUAL adjust control rods as necessary to maintain Tavg within 1.5 °F of Tref. • Adjust Boron concentration as necessary

Deleted: 70

NOTE

- WHEN ALL Control Rods are above the Rod Insertion Limit THEN adequate Shutdown Margin will exist.
- IF the affected rod is below the Rod Insertion Limit THEN reactivity equivalent to "The Most Reactive Rod" SHALL be subtracted from the "Total Reactivity Due To Control Rod Insertion" when calculating Shutdown Margin

	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	**VERIFY Shutdown Margin** a. VERIFY adequate Shutdown Margin	a. INITIATE Boration to restore Shutdown Margin.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	004 K5.19	
	Importance Rating	3.5	

Knowledge of the operational implications of the following concepts as they apply to the CVCS: Concept of SDM.

Proposed Question: RO 74

The plant is operating at 80% power.

Which ONE (1) of the following actions will result in an INCREASE in Shutdown Margin?

A. Withdrawing control bank D 3 steps

B. Lowering Condenser Steam Dump setpoint by 50 psi

C. Initiating boration to control Axial Flux Difference within the target band

D. Inserting control bank D 10 steps to restore Axial Flux Difference to the target band

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Rods will have no effect by themselves
B. Incorrect. No effect until pressure mode operation, then a lower setpoint would reduce SDM
C. Correct.
D. Incorrect. Rods will have no effect by themselves

Technical Reference(s): Theory (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	056 A2.04	
	Importance Rating		2.8

Ability to (a) predict the impacts of the following malfunctions or operations on the Condensate System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps.

Proposed Question: SRO 74

Given the following conditions:

- The plant is at 100% power.
- All control systems are in their normal automatic alignments
- 33 Condensate pump trips and cannot be restarted

Which ONE (1) of the following actions is required?

A. Enter ONOP-FW-1, Loss of Feedwater, and place MBFP speed control in manual. Reduce speed until suction pressure is stable above 350 psig

B. Enter ONOP-FW-1 and initiate a manual turbine runback and reactor power reduction to maintain MBFP suction pressure above 350 psig

C. Enter E-0, Reactor Trip or Safety Injection, and transition to ES-0.1, Reactor Trip Response, to establish AFW flow

D. Enter E-0, Reactor Trip or Safety Injection, and transition to FR-H.1, Loss of Secondary Heat Sink, to establish AFW flow

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Lose a condensate pump, do not run MBFP back, run load back
B. Correct
C. Incorrect. No need to trip on loss of 1 pump

D. Incorrect. No need to trip, and wrong transition for conditions

Technical Reference(s): ONOP-FW-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5002, 5240 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must diagnose plant conditions and determine a course of action

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

IF MBFP SUCTION PRESSURE DECREASES TO LESS THAN 315 PSIG, THEN MBFP SPEED WILL AUTOMATICALLY LOWER.

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Comment: Former Note - Each MBFP is rated at 15300 gpm at 4740 rpm with a discharge pressure of 970 psig.

5. **CHECK MBFP Suction Pressure:**
   - Suction pressure – GREATER THAN 350 PSIG
   - Heater Drain Pumps – Previously Running Pumps in service.
   - Condensate Pumps – Previously Running Pumps in service.

PERFORM the following:

a. IF MBFP suction pressure is less than 350 psig, THEN PERFORM the following:

   1) IF any Condensate Booster Pump in AUTO, THEN VERIFY Standby Pump EMERGENCY STARTS.

   2) VERIFY CD-AOV-521, Polisher Vessels and Post Filters Bypass, is open.

   3) ENSURE CD-MOV-522, Booster Pumps Discharge, is fully open.

b. REFER TO Attachment 1, Approximate Unit Load with Various Pump Configurations, Page 15, for approximate load limits.

(STEP 5 CONTINUED ON NEXT PAGE)

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	
Group #	1	
K/A #	013 A2.01	
Importance Rating	4.6	

Ability to (a) predict the impacts of the following malfunctions or operations on the ESF Actuation System; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: LOCA.

Proposed Question: RO 75

Given the following conditions:

- The plant was operating at 100% power.
- A PORV failed open.
- The reactor has tripped on low pressurizer pressure.
- Pressurizer pressure is at 1700 psig and dropping.
- Containment pressure is 0.4 psig and rising slowly

Plant status is as follows:

- All control rods are fully inserted.
- Normally running Charging pump is in service.
- No SI or RHR pumps running.
- CIA not actuated.
- CIB not actuated.
- Main Steam Lines not isolated.
- Feedwater Isolation not actuated.

Which ONE (1) of the following describes the actuation(s) that must be manually performed in E-0, Reactor Trip or Safety Injection?

A. Safety Injection only.

B. Main Steam Line Isolation only.

C. Safety Injection and Main Steam Line Isolation.

D. Safety Injection, Main Steam Line Isolation, and Containment Spray.

Proposed Answer: C

A. Incorrect. If SI actuated, must also manually initiate MSLI
B. Incorrect. Pressure below SI setpoint.
C. Correct
D. Incorrect. Spray is not actuated on low pressurizer pressure.

Technical Reference(s): E-0 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0457 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #	068 G2.4.31	
	Importance Rating		3.4

Emergency Procedures / Plan: Knowledge of annunciators alarms and indications, and use of the response instructions.

Proposed Question: SRO 75

Given the following conditions:

- The plant is operating at 100% power with all systems in normal alignments.
- A liquid release of 31 Monitor Tank is in progress.
- The following annunciators are received in the Control Room:
    - CHANNEL FAILURE
    - R-18 LIQ. EFF.
- R-18, Liquid Waste Effluent monitor is alarming.
- The discharge remains in progress.

Which ONE (1) of the following describes effect on the plant and the actions required?

A. The radiation monitor has failed. Request that HP recheck calculations and provide recommendations on action to be taken.

B. The radiation monitor has failed. The release may continue provided 2 independent samples are taken and the activity is verified to be below ODCM limits.

C. The discharge should have automatically stopped. Stop the discharge, direct Chemistry to sample the test tank and refer to the ODCM for further actions.

D. The discharge should have automatically stopped. Stop the discharge, direct Chemistry to sample the test tank and declare an ALERT based on unauthorized radwaste discharge exceeding 10CFR100 limits.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Alarm level is exceeded requiring the discharge to be stopped
B. Incorrect. This is an ODCM action for a radiation monitor failure, not an alarm condition.
C. Correct.
D. Incorrect. Alert should not be declared and 10CFR100 limits are for accidents

Technical Reference(s): ARP (Attach if not previously provided)
ODCM

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 6150 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:
10CFR55.43(b) items 2, 4, and 5 because the SRO must know the requirements for radioactive discharge and assess conditions where limits may be exceeded, directing appropriate action

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	015 K4.03	
	Importance Rating	3.9	

Knowledge of NIS design feature(s) and/or interlock(s) provide for the following: Reading of source range/intermediate range/power range outside Control Room.

Proposed Question: RO 76

Which ONE (1) of the following actions is a continuous action after evacuating the control room using ONOP-FP-1A, Safe Shutdown From Outside The Control Room?

A. Check the reactor SUBCRITICAL using N38 Source Range.

B. Maintain Narrow Range SG level between 10% and 50%.

C. Vent the Main Generator Hydrogen if H2 pressure remains greater than 50 psig.

D. Maintain the EDGs running at no load if offsite power is available.

Proposed Answer: A

Explanation (Optional):

A. Correct
B. Incorrect. Only maintain 2 WR levels
C. Incorrect. Not a continuous step
D. Incorrect. Would shut down EDGs that are running unloaded

Technical Reference(s): ONOP-FP-1A Attachment 1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not Available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

R76

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

Attachment 1
CRS – ACTIONS

ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7. CHECK Reactor – SUBCRITICAL • N38 Source Range – INDICATING • N38 Source Range – COUNTS DECREASING	PERFORM the following: a. DISPATCH Nuclear NPO to PERFORM the following: 1) ENSURE Power Panel POA Circuit #7, is CLOSED (Upper Penetration Area, on wall near isolation cabinet) 2) ENSURE Source Range N38 Power Supply Selector Switch is in EMERGENCY position (South of Power Panel POA) 3) IF N38 is unavailable, THEN CHECK N39. (Upper Electrical Penetration Area inside Alternate Source Range/RCS Temperature Cabinet) b. IF N38 is energized AND EITHER OF THE FOLLOWING CONDITIONS EXISTS, THEN if ossible, INITIATE performance of Attachment 12, EMERGENCY BORATION – LOCAL. • Source Range does NOT come on-scale after 15 minutes • Source Range does NOT slowly decrease once on scale

-END OF ATTACHMENT-

Examination Outline Cross-reference:

Level	RO	SRO
Tier #		2
Group #		2
K/A #	016 G2.1.28	
Importance Rating		3.3

Conduct of Operations: Knowledge of the purpose and function of major system components and controls.

Proposed Question: SRO 76

Reactor/Turbine power is 42%. A Reactor trip occurs due to I&C Testing.

After the trip, you observe the following parameter values:

- REACTOR POWER is 5%
- FEEDWATER FLOW on SG 33 and 34 are 25%
- FEEDWATER FLOW on SG 31 and 32 are 15%

Select the answer that describes how the AMSAC system will respond to these indications.

A. AMSAC WILL NOT actuate because PT-412A & PT-412B will indicate turbine load less than 40% following the turbine trip

B. AMSAC WILL actuate after the functional timer times out and will start the ABFPs

C. AMSAC WILL NOT actuate because the feedwater LOW flow transmitters setpoint/logic is not satisfied

D. AMSAC WILL NOT actuate because C-20 timer will actuate bypassing AMSAC before the actuation timer is completed

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Load prior to trip is permissive

B. Incorrect. No actuation signal

C. Correct.

D. Incorrect. There is no timer for permissive going up. Timer is for going back below permissive level

Technical Reference(s): SD-21.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 4171 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	017 K1.01	
	Importance Rating	3.2	

Knowledge of the physical connections and/or cause/effect relationship between the ITM system and the following: Plant computer

Proposed Question: RO 77

Due to a ventilation failure in the electrical tunnel, the Train A qualified core exit thermocouple junction box is 20°F higher than the Train B qualified core exit thermocouple junction box.

Which ONE (1) of the following describes the core exit thermocouple (CET) readings as displayed on the plant computer during this event? (There are no other failures)

A. Train A qualified CETs will be 20°F higher than Train B; their relationship to the non-qualified CETs cannot be determined from the above.

B. Train A qualified CETs will be the same as Train B; their relationship to the non-qualified CETs cannot be determined from the above.

C. Train A qualified CETs will be the same as Train B; both trains will be 20°F lower than the non-qualified CETs.

D. Train A qualified CETs will be the same as Train B; both trains will be the same as the non-qualified CETs.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Non-qualified are heated. Qualified are temperature compensated
B. Incorrect. Non-qualified are heated. CAN determine status
C. Incorrect. Train A and B are compensated
D. Correct. The qualified CETs are temperature compensated at the junction box, so ventilation failure will not affect their reading. The non-qualified CETs have heated junction boxes, so their readings are not affected by the event.

Technical Reference(s): SD-14 section 2.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0831 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

of the individual operation selector switches. The pushbutton only stops detectors that are moving in the insert direction (i.e. towards top-of-core or top-of-storage).

2.2 INCORE THERMOCOUPLE SYSTEM

2.2.1 Thermocouples (Figures 14.0-1 & 12)

The thermocouple system utilizes 65 thermocouples, positioned to measure fuel assembly coolant outlet temperature at pre-selected core locations (Figure 14.0-1). Connectors and cabling for twenty of the thermocouples have been modified to meet R.G. 1.97 post accident standards. (These 20 will be referred to as "qualified" in the remainder of this document.) The thermocouples are chromel-alumel (type K) and have an accuracy of ±2°F. Ten of the 45 non-qualified thermocouples have been permanently retired and cannot be used.

The non-qualified thermocouples are divided into two trains, each with a heated reference junction, maintained at 160°F by heaters and thermostats. The junction boxes are located in the seal table room in the VC. Reference junction temperatures are indicated on the Incore T/C page on the CFMS.

The twenty qualified thermocouples use an ambient temperature junction located in the upper electrical tunnel. These thermocouples are also divided into two trains; ten feeding data to RVLIS/QSPDS Train A and the other ten feeding RVLIS/QSPDS Train B.

Table 14-2 shows a list of thermocouples, by number, core location and train.

2.2.2 Thermocouple Routing and Seal Assemblies (Figures 14.0-13 & 14)

The design features of the internal distribution of the thermocouples is discussed in System Description 2, Reactor Vessel and Internals. The thermocouples are enclosed in stainless steel sheaths. These sheaths, which are removable, are routed in guide tubes that position the thermocouple end at the selected core location. The guide tubes extend the entire distance from the core location to the seal assemblies and are supported as described in the Reactor Vessel and Internals, System Description 2.

The guide tubes are routed to one of five instrument ports used for the thermocouples. The individual thermocouple guide tubes are enclosed in a thermocouple port column that protrudes over the thermocouple. Thirteen thermocouple leads exit the vessel at each of the five ports.

The RCS pressure boundary is maintained at the thermocouple ports by means of mechanical seal assemblies called Conoseals. During refueling, the Conoseals are manually removed and a cover is installed over the leads.

The individual thermocouple wires are then separated and routed to the reference junctions. The division of the non-qualified thermocouples into two trains was made to eliminate the possibility that a single failed reference junction would totally negate the value of the readings received from the thermocouple system. In case a reference junction does fail, the thermocouples connected to the remaining reference junction will still provide a meaningful representation of the core temperatures. The reference junction boxes are located in the seal table room and they are maintained at 160°F by an electric heater in the box.

An ambient reference junction was used for the qualified thermocouples to eliminate the use of electric heaters. Ten qualified thermocouples are routed to RVLIS Train A and ten are routed to RVLIS Train B.

2.2.3 Incore Thermocouple Control Cabinet (Figure 14.0-15)

A control panel for the incore thermocouples is provided in the CR, adjacent to the incore moveable detector controls. A front view of the panel is shown on Figure 14.0-15. A multi-point precision indicator has been provided to indicate the temperature sensed by the thermocouples. Only one thermocouple at a time can be connected to the indicator. Switches have been provided on the front of, and above, the indicator to select the thermocouple desired to be read.

An additional selector switch located on the front of the panel allows either the low (0-400°F) or high (400-700°F) range measuring circuit to be used. Besides being directed to the indicator, the thermocouple outputs are also sent to the plant computer (CFMS).

The qualified thermocouples no longer indicate on the thermocouple control panel, although the switches for these thermocouples still exist on the panel. Rather, these thermocouple outputs go directly to the RVLIS cabinets in the CR. The RVLIS system in turn sends the measured thermocouple temperatures to the QSPDS, which downloads the data to the CFMS.

A core map printout containing all 65 thermocouple temperatures can be requested from the CFMS. The CFMS also stores thermocouple temperature data hourly (on the hour) for 24 hours to provide historical thermocouple maps in addition to the current data.

Instructions for obtaining thermocouple maps from the CFMS are contained in the ERFDADS User's Manual.

Chromel-alumel thermocouples have a reasonably linear output relative to temperature from their fixed reference. Besides the Thermocouple Control Panel readout (0-700°F) or the computer indication (32.0-2300.0°F), a method to augment the data is available. A voltmeter may be connected across the output junction, in the CR, at the Thermocouple Control Panel and using a response curve or data from the manufacturer, record and interpret the indicated thermocouple output to determine core temperature.

2.3 Fixed Neutron Flux Detector System

The original plant design for IP3 utilized 50 moveable detector thimbles and eight fixed detector thimbles in the core. The fixed detectors were part of an experimental system. All fixed detector electronics has been removed from the CR, and the fixed detector thimbles have been removed from the reactor and eight moveable detector thimbles have been installed in their place. The moveable detector system can now access 58 core locations.

Some of the original cabling for the fixed incore detector system (between the seal table and the containment penetration) is still in place and has been used for transmitting television signals from the VC to the CR.

Note: The eight converted fixed detector locations cannot be accessed in EMERGENCY mode due to tubing bend radius limitations at the seal table. The core locations of these thimbles are: C-8, E-5, E-11, H-3, H-13, L-5, L-11 and N-8.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #	062 G2.1.33	
	Importance Rating		4.0

Ability to recognize indications for system operating parameters which are entry level conditions for Technical Specifications

Proposed Question: SRO 77

Given the following conditions:

- The plant is operating at 100% power.
- All 3 EDGs are declared INOPERABLE due to a common mode failure.
- While verifying breaker alignments, the determination is made that 1 off-site power source is also inoperable

Which ONE (1) of the following actions are required in accordance with Technical Specifications?

A. Immediately enter TS 3.0.3 and make preparations for a plant shutdown.

B. Immediately verify availability of the remaining Off-Site Power source. Restore at least 1 EDG within 6 hours or enter TS 3.0.3.

C. Immediately verify availability of the remaining Off-Site Power source. Restore at least 1 EDG to OPERABLE status within 24 hours or enter TS 3.0.3.

D. Return at least 1 EDG to OPERABLE status within 24 hours or enter TS 3.0.3 and make preparations for a plant shutdown.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. As soon as off-site is inoperable, go to 3.0.3

C. Incorrect. Same as B

D. Incorrect. Same as B and C

Technical Reference(s): TS section 3.8 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0265 (As available)

Question Source: Bank #

Modified Bank # (Note changes or attach parent)

New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge

Comprehension or Analysis X

10 CFR Part 55 Content: 55.41

55.43 X

Comments:

10CFR55.43(b) item 2 because the SRO must apply TS action in a case where TS 3.0.3 applies

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Two or more DGs inoperable.	E.1 Restore at least two DGs to OPERABLE status.	2 hours
F. Required Action and associated Completion Time of Condition A, B, C, D, or E not met.	F.1 Be in MODE 3. AND F.2 Be in MODE 5.	6 hours 36 hours
G. One or more offsite circuits and two DGs inoperable.	G.1 Enter LCO 3.0.3.	Immediately
H. Two offsite circuits and one or more DGs inoperable.	H.1 Enter LCO 3.0.3.	Immediately

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	001 A3.05	
	Importance Rating	3.5	

Ability to monitor automatic operation of the CRDS, including: Individual versus group position

Proposed Question: RO 78

Given the following conditions:

- Reactor startup is in progress
- While stabilizing power at 1.0 E-8 amps, IR nuclear power suddenly dropped by one-third decade and continued to decrease at a -0.3 dpm SUR
- There was no significant change in Tavg
- The Control Bank D step counters now read 119 steps
- The individual rod position indication for all Control Bank D Group 1 rods indicates 0 steps
- All other rod position indications are unchanged

Which ONE (1) of the following can be determined from these indications?

A. The individual rod position indicators have failed, because more than one dropped rod would have caused an automatic reactor trip.

B. The Control Bank D Group 1 step counter has failed, because it should read zero when all of the rods in this group are fully inserted.

C. The Control Bank D step counters and the associated individual rod position indicators are consistent with a multiple dropped rod accident.

D. Either the Control Bank D step counters, or the individual rod position indicators, have failed, but there is not enough information to determine which ones have failed.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Multiple dropped rods do not always initiate a trip
B. Incorrect. Demand counters do not indicate zero for a dropped rod
C. Correct.
D. Incorrect. Demand counters indicate properly, there is no failure, except for a dropped rod event

Technical Reference(s): SD-16.1, 16.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0881 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:

Level	RO	SRO
Tier #		2
Group #		3
K/A #	008 A2.02	
Importance Rating		3.5

Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS, and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: High/Low Surge Tank Level

Proposed Question: SRO 78

Given the following conditions:

- The plant is operating at 100% power
- Both Component Cooling Water Surge Tank levels are lowering.
- Makeup water is initiated and the Component Cooling Water headers are split.
- Level in 31 Component Cooling Water Surge Tank continues to decrease while level in 32 Component Cooling Water Surge Tank stabilizes.

Which ONE (1) of the following actions is required if 31 CCW Surge Tank continues to drop?

A. Reduce loads on 32 CCW header. If CCW flow can not be restored to 31 CCW header within 2 minutes, then trip the reactor, trip all four RCPs and establish city water cooling to the charging pumps.

B. Trip the CCW pump on 31 header. If CCW flow can not be restored to 31 CCW header within 2 minutes, then trip the reactor, trip all four RCPs and establish city water cooling to the charging pumps.

C. Trip the CCW pump on 31 header. If spent fuel pit temperatures begin to rise, then place the SFP backup cooling in service. Shut down the plant in accordance with Technical Specifications.

D. Reduce loads on 32 header. Isolate charging and letdown and reduce charging pump speed to minimum. Shut down the plant in accordance with Technical Specifications.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Wrong header, no time limit for 31 CCW header

B. Incorrect. No time limit for 31 CCW header

C. Correct.

D. Incorrect. 32 header unaffected

Technical Reference(s): ONOP-CC-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5245 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:
10CFR55.43(b) item 5 because the SRO must assess plant conditions and determine appropriate procedural action

5.2. IF 31 Component Cooling Surge Tank is decreasing in an UNCONTROLLED manner THEN:

5.2.1. Place the CCW pump lined up on the 31 header in Trip Pull Out

- 31 Component Cooling Pump

OR

- 32 Component Cooling Pump

5.2.2. CLOSE the following valves:

- AC-832A, 31 CC Surge Tank Outlet Isolation
- AC-764A, 31 CC Surge Tank Recirc. Line Isolation
- AC-831A, 31 CC Surge Tank Primary Water Makeup Inlet Isolation

5.2.3. IF the 32 Component Cooling Pump is NOT aligned to the 32 header, THEN:

5.2.3.1. CLOSE AC-759C, 31 & 32 CC Pump Discharge Cross Connection Isolation
AND CLOSE AC-766A, 31 & 32 CC Return Headers Cross Connection Isolation

5.2.3.2. OPEN AC-759D, 32 & 33 CC Pump Discharge Cross Connection Isolation
AND OPEN AC-766B, 31 & 32 CC Return Headers Cross Connection Isolation

5.3. IF 32 Component Cooling Surge Tank is decreasing in an UNCONTROLLED manner THEN:

5.3.1. Place the CCW pump lined up on the 32 header in Trip Pull Out

- 32 Component Cooling Pump

OR

- 33 Component Cooling Pump

5.3.2. CLOSE the following valves:

- AC-832B, 32 CC Surge Tank Outlet Isolation
- AC-764B, 32 CC Surge Tank Recirc. Line Isolation
- AC-831B, 32 CC Surge Tank Primary Water Makeup Inlet Isolation

5.3.3. IF the 32 Component Cooling Pump is NOT aligned on the 31 header, THEN:

5.3.3.1. CLOSE AC-759D, 32 & 33 CC Pump Discharge Cross Connection Isolation
AND CLOSE AC-766B, 31 & 32 CC Return Headers Cross Connection Isolation

5.3.3.2. OPEN AC-759C, 31 & 32 CC Pump Discharge Cross Connection Isolation
AND OPEN AC-766A, 31 & 32 CC Return Headers Cross Connection Isolation

5.4. WHEN level is restored in all UNISOLATED Surge tank(s), THEN CLOSE the following:

- PW-70, Primary Water To CC Surge Tanks Isolation
- AC-831A, 31 CC Surge Tank Primary Water Makeup Inlet Isolation
- AC-831B, 32 CC Surge Tank Primary Water Makeup Inlet Isolation

5.5. IF the component cooling pumps cannot be started, THEN an electrical fault could exist. Investigate and attempt to correct the fault.

5.5.1. IF necessary, THEN place 32 CCW pump on the alternate feed per SOP-EL-012, Operation Of The Alternate Shutdown Equipment.

5.5.2. Reduce Component Cooling loads as necessary.

5.6. IF there is a loss of flow to the non-regenerative heat exchanger AND normal charging and letdown are in service, THEN ISOLATE charging and normal letdown,

5.6.1. PLACE excess letdown in service as per SOP-CVCS-002, Charging Seal Water And Letdown Control and maintain seal injection.

5.7. IF there is a loss of flow to both the non-regenerative and excess letdown heat exchangers, THEN isolate charging and letdown, AND REDUCE charging pump speed to minimum to maintain a slightly greater than zero differential pressure across the reactor coolant pump thermal barriers.

5.8. IF a high temperature condition exists in either the CCW pump inlet OR CCW heat exchanger outlet, AND levels in the surge tanks are constant or increasing, then:

5.8.1. Reduce letdown by placing the 45 gpm orifice in service.

5.8.2. Check that the required service water pumps are running.

5.8.3. Check that CCW heat exchanger service water valves have not been inadvertently closed.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	056 G2.1.2	
	Importance Rating	3.3	

Conduct of Operations: Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: RO 79

Given the following conditions:

- The plant is at 92% power.
- All equipment is operating as required
- 31 Condensate Booster pump is in service but is no longer required
- The CRS directs removal of 31 Condensate Booster pump from service

Which ONE (1) of the following actions may have to be taken as a result of removing the Condensate Booster Pump from service?

Action may have to be taken to remove windup from...

A. Feedwater Heater level control valves, to prevent the Feedwater Heaters from a high level condition

B. Feedwater Heater level control valves, to prevent the Feedwater Heaters from a low level condition

C. Heater Drain Tank level control valve, to prevent the Heater Drain Tanks from a high level condition

D. Heater Drain Tank level control valve, to prevent the Heater Drain Tanks from a low level condition

Proposed Answer: D

Explanation (Optional):

a. Incorrect. Wrong valves
b. Incorrect. Wrong valves
c. Incorrect. Correct valves, but wrong reason. Level would go low as HDP try to keep up with less system pressure
d. Correct

Technical Reference(s): SOP-C-002 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1521 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

20
79

4.3.3 Bypassing Condensate Polisher Facility

CAUTION

- WHEN unit is at power, THEN bypassing CPF may cause a FW System transient.
- WHEN condensate booster pumps are secured, THEN HDT Level Control System operator action may be required to prevent emptying HDT. Based on power level, windup may need to be removed from HDT LCVs per SM direction.

_____ 4.3.3.1 OPEN CD-AOV-521, Polisher Vessels & Post Filters Bypass.

_____ 4.3.3.2 IF desired to completely bypass polisher, THEN:

_____ a) IF Secondary pH Chemical Injection pump(s) are operating, THEN SECURE pump(s) per Section 4.6.2 and NOTIFY Chemistry that pump(s) are secured.

_____ b) PLACE control switch(es) for standby condensate booster pump(s) in PULL OUT. **{Reference 5.1.1}**

_____ c) STOP operating condensate booster pump(s) and PLACE control switch(es) in PULL OUT. **{Reference 5.1.1}**

_____ d) OPEN CD-AOV-519, Polisher Facility Bypass.

_____ e) IF desired to isolate polisher, THEN GO TO Section 4.6.3.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		2
	Group #		3
	K/A #	078 G2.1.23	
	Importance Rating		4.0

Conduct of Operations: Ability to perform specific system and integrated plant procedures during all modes of plant operation.

Proposed Question: SRO 79

Given the following conditions:

- A loss of Instrument Air has occurred.
- The CRS has directed a reactor trip in accordance with the requirements of ONOP-IA-1, Loss of Instrument Air
- Prior to initiating the reactor trip, the RO informs the CRS that some actions of ONOP-IA-1 may help stabilize the plant.

Which ONE (1) of the following describes the allowable usage of ONOP-IA-1 while responding to this event?

A. Remain in ONOP-IA-1 until all actions are completed. If plant cannot be stabilized, trip the reactor and enter E-0, Reactor Trip or Safety Injection.

B. Trip the reactor, enter E-0. When immediate actions are complete, parallel use of ONOP-IA-1 is allowed.

C. Trip the reactor, enter E-0. Discontinue use of ONOP-IA-1 until transition to Plant Operating Procedures has been made.

D. Trip the reactor, enter E-0. Discontinue use of ONOP-IA-1 until transition to any recovery procedure. Parallel use is only allowed when E-0 is complete.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. If trip called for, the do it

B. Correct.

C. Incorrect. May use in parallel with E-0

D. Incorrect. May use in parallel with E-0

Technical Reference(s): ONOP-IA-1 (Attach if not previously provided)
EOP Users Guide

Proposed References to be provided to applicants during examination: NONE

Learning Objective: EOP 01 1.1.2 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must assess plant conditions and determine appropriate procedure usage for the event in question

579

4.8 Use Of Off Normal Operating Procedures And Alarm Response Procedures With EOPs

While performing EOPs, various plant conditions may occur which would normally be addressed by ONOPs or Alarm Response Procedures (ARPs). These procedures should be implemented during use of the EOPs under the following guidelines.

4.8.1 WHEN procedures ES-0.1, 0.2, 0.3 or 0.4 are in effect, THEN ONOPs may be used at the discretion of the CRS or SM. The actions of the EOPs SHALL be completed either in parallel or immediately after the off normal/alarm condition is addressed.

4.8.2 WHEN any other EOP (except those listed above) is in effect, THEN ONOPs may be performed at the discretion of the CRS or SM, only if they do not interfere with the actions called for in the EOPs and if their implementation is necessary to help mitigate the consequences of the event. Actions of the ONOP and ARPs should be performed in parallel with the EOPs, preferably by a spare licensed operator.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	061 K4.04	
	Importance Rating	3.1	

Knowledge of AFW design feature(s) and/or interlock(s) which provide for the following: Prevention of AFW runout by limiting AFW flow.

Proposed Question: RO 80

How are the Motor Driven Auxiliary Boiler Feed Pumps (ABFPs) protected from runout conditions at IP3?

A. Maximum AFW flow is limited by the design of the AFW pump flow control valves

B. AFW flow is measured and provides an input to the AFW regulating valve control circuit to limit pump flow

C. AFW pump discharge pressure is measured and provides an input to the AFW regulating valve control circuit to limit pump discharge pressure

D. AFW pump suction flow is measured and provides an input to the FCV-1121 and FCV-1123 valve controllers to provide recirculation flow back to the pump suction

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Valves designed to pass max flow through pipe
B. Incorrect. No flow signal to valve control
C. Correct.
D. Incorrect. Recirculation not affected, valves operate based on discharge pressure

Technical Reference(s): SD-21.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 4171 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: ILO Bank 10472
Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

180

All eight valves have nitrogen backup to instrument air.

Each Auxiliary Feed Regulating Valve has a locked open inlet and outlet isolation valve and a non return check valve between the outlet isolation valve and the Auxiliary Feed Regulating Valve.

2.6.1 Motor-driven pump runout protection

The Auxiliary Feed Flow Regulating Valves in the motor-driven pump headers, FCV-406A, B, C, D are provided with a feature that prevents a motor-driven pump runout condition. Refer to Figure 21.2-9.

Runout can occur when the pumps are supplying feed to steam generators at any pressure. Operating at SG pressure reduced to as low as 110 psig presents the most limiting pump conditions. Runout could result in overheating and damage to the pump motors. High flow rates require high power output from the ABFW pump motors. Power greater than 400 hp reduces the service factor of the pump, decreasing its reliability. Limitations of the 480 VAC power supplies and their backup diesel generators require strict pump motor current limitations on the motor driven pump.

Pressure transmitter PT-406A(B) signal, at the discharge of each individual pump , is fed to its corresponding Pressure (cutback) Controller PC-406A(B). Setpoint of this controller is set biased on the total flow output signals from two SG ABFW supply line flow transmitters FT-1200 & 1201 (FT-1202 & 1203) Currently , the Pressure Controller setpoints are adjusted to obtain an ABFW flow rate of approximately 370 to 380 gpm per each pump.

This flow range was selected to provide a margin above minimum required AFWS flow of 345 gpm at the lowest bus voltage conditions. If the Pressure Controller input signal is <setpoint, the controller output to the HI Signal Selectors increases.

The Hi Selectors PM-406A(B) select the highest signal of either Pressure (cutback) Controller or the operators manual Hand Controllers HC406A,B,C.D used to modulate the reduced flow through the ABFW pump flow discharge valves, via the I\P converters. However, the Pressure (cutback) Controller may override the output signal of the Hand Controller signal during decreasing pump discharge head. It is necessary to protect the motor driven pumps during a large pipe break or other SG pressure decrease.

The Pressure (cutback) Controller output is Zero as long as the pump discharge pressure is greater than or equal to approximately 1350 psig at the pump design point. As the discharge pressure decreases, the controller maintains it at about 1350 psig by throttling down manually

RS

flow control valves FCV-406A,B,C,D. The Pressure Controller settings are established during a full flow test so that minimum and maximum and minimum flow limits are not exceeded, in accordance with 3PT-007A

When the motor driven ABFP pumps are in standby, the position controllers are set full open. However the cutback controllers sense the discharge pressure less than 1350 psig and cause the valves to close.

2.7 Backup Nitrogen

A Nitrogen bottle bank is located in the ABFP room to backup the instrument air to the Aux. Feed System. When the instrument air pressure falls to 82 psig, an alarm comes on in the CCR on APP-6 panel SCF "N_2 MAKEUP TO INST. AIR LOW PRESS AUX BFP ROOM". The Nitrogen bottle bank begins to supply backup gas to the following AFWS components when the instrument air pressure falls below the regulator setting of 50 psig.

- FCV-405 (A-D) feedwater regulating valves from the 32 ABFP
- FCV-406 (A-D) feedwater regulating valves from the 31 & 33 ABFPs
- PCV-1187 and 1189 City water supply to the suction of the 31 & 33 ABFPs
- MS-HCV-1118 The hand controller for the 32 ABFP.

2.8 Water Hammer Hazard indication

Eight red lights are located above the Feed Regulating Valve controllers. The lights are not mentioned in procedure but they do remain active.

These lights were added because of an NRC concern related to water-hammer in feedlines for early steam generators. In case of a delayed startup of the ABFPs, the feed rings could be drained. Cold AFW feed would often cause significant water-hammer. In some plants this water hammer deformed hangers and supports. Design changes to provide the feed rings with J tubes to prevent draining the feed ring, and careful attention to the feed ring - feed line fit up in the steam generators reduced these concerns. The IP3 replacement steam generators all have J tubes on the feed rings that do not allow the feed rings to drain reducing the potential for water hammer.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.11	
	Importance Rating		3.8

Knowledge of less than one hour technical specification action statements for systems.

Proposed Question: SRO 80

Given the following conditions:

- The plant is at 100% power
- A failure of PORV 455C actuation circuitry requires declaring the valve inoperable.
- The valve cannot be cycled

Which ONE (1) of the following describes the Technical Specification action required?

Within ONE hour...

A. Remove power from PORV 455

B. Verify operability of PORV 456

C. Verify operability of PORV 455C block valve

D. Close PORV 455C block valve and remove its power

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Power not removed from PORV
B. Incorrect. Considered operable until proven otherwise
C. Incorrect. Considered operable
D. Correct. Required for PORV that cannot be cycled

Technical Reference(s): TS 3.4.11 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0912 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 X

Comments:
10CFR55.43(b) item 2 because the SRO must apply operability for TS equipment

SO
IP3

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.11 Pressurizer Power Operated Relief Valves (PORVs)

LCO 3.4.11 Each PORV and associated block valve shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

------------------------------------- NOTES -------------------------------------

1. Separate Condition entry is allowed for each PORV.

2. LCO 3.0.4 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more PORVs inoperable and capable of being manually cycled.	A.1 Close and maintain power to associated block valve.	1 hour
B. One PORV inoperable and not capable of being manually cycled.	B.1 Close associated block valve.	1 hour
	AND	
	B.2 Remove power from associated block valve.	1 hour
	AND	
	B.3 Restore PORV to OPERABLE status.	7 days

(continued)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	068 A3.02	
	Importance Rating	3.6	

Ability to monitor automatic operation of the Liquid Radwaste System including: Automatic isolation.

Proposed Question: RO 81

A liquid release of 31 Monitor Tank is in progress.

R-18, Liquid Radwaste Effluent Monitor, goes into alarm.

Which ONE (1) of the following describes the actions that occur or must be taken to terminate the release?

A. The release is automatically terminated by the automatic closure of RCV-018 in the liquid radwaste effluent line.

B. The BOP must defeat the RCV-018 key switch permissive to allow the automatic closure of RCV-018

C. The NPO must manually close RCV-018 and WD-1785, liquid effluent flow control valve

D. The BOP must defeat the RCV-018 key switch permissive and the NPO must manually close RCV-018

Proposed Answer: A

Explanation (Optional):

A. Correct
B. Incorrect. Key switch allows opening
C. Incorrect. NPO may close control valve, but RCV-018 will close on it's own
D. Incorrect. RCV-018 will close automatically. Key switch is an open permissive

Technical Reference(s): PSA-L0505 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5043 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

IP3 R81

(2) Discharge is from tank via pumps through rad monitor R-18. — Located 41' PAB, N. of the Mon. Tk. Pps.

(3) Valve RCV-18 is controlled from WDP.

(4) Control Room has an open permissive keyswitch. — Blocked/Unblocked

(5) Flow is controlled with manual valve WD-1785, 55' PAB in the room next to the WDP.

(6) Flow is monitored on the south wall, next to the WDP.

f. Allowable discharge flow rate will be calculated and is based on activity of the water and available dilution flow

12. Plant Effluent Release Header — E.O.5.n TP-4

a. Release header begins in the room south of the WDP and ends at the SWS discharge line to the river.

b. Monitor Tanks discharge into this line.

c. All releases are normally from the Monitor Tanks. This header handles all plant radioactive releases except S/G blowdown.

d. Instrumentation available to monitor the release includes:

(1) Flow indicator next to the WDP. — FI-1064

(2) R-18, indication on the WDP and RM racks in the Control Room.

e. Control valve RCV-018 is in the line prior to the SWS connection.

(1) Closes on high activity levels and terminates the release.

(2) Controlled from WDP and has position indication.

(3) Open-permissive in the Control Room.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		1
	K/A #	G2.1.20	
	Importance Rating		4.2

Ability to execute procedure steps.

Proposed Question: SRO 81

Given the following conditions:

- The plant was operating at 100% power when a reactor trip occurred on low pressurizer pressure.
- A Steam Generator Tube Rupture was diagnosed, and E-3, Steam Generator Tube Rupture was entered.
- E-3, Step No. 31, "Minimize RCS-To-Secondary Leakage" is being performed (attached).

Given the following control room indications:

- SG 33 Blowdown Sample indicates high radiation.
- SG 33 NR level is 32% and dropping.
- Feed flow has been isolated to SG 33.
- SG 31, 32, and 34 levels are slowly lowering.
- PRZR level is 63% and rising.

Which one of the following describes the appropriate operator action?

A. Depressurize RCS.

B. Lower Charging flow.

C. Turn on PRZR heaters.

D. Depressurize RCS <u>and</u> lower Charging flow.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. If ruptured SG level is rising with a lower pzr level than exists, would depressurize RCS
B. Incorrect. If przr level is greater than 73%, would lower charging
C. Correct.

D. Incorrect. If ruptured SG level was rising, would perform both

Technical Reference(s): E-3 Step 31 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: E-3, Step 31

Learning Objective: 5706 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must determine the appropriate action for a given set of conditions

STEP | ACTION/EXPECTED RESPONSE | RESPONSE NOT OBTAINED

(Step 31 continued from previous page)

* a. PERFORM appropriate action(s) from table:

PRZR LEVEL	RUPTURED SG(s) LEVEL		
	INCREASING	DECREASING	OFFSCALE HIGH
LESS THAN 29% [47%]	• INCREASE charging flow • DEPRESSURIZE RCS using Step 31.c.	INCREASE charging flow	• INCREASE charging flow • MAINTAIN RCS and ruptured SG(s) pressures equal.
BETWEEN 29% [47%] <u>AND</u> 50%	DEPRESSURIZE RCS using Step 31.c.	ENERGIZE ONE Group of PRZR Heaters	MAINTAIN RCS and ruptured SG(s) pressures equal.
BETWEEN 50% <u>AND</u> 73% [58%]	• DECREASE charging flow • DEPRESSURIZE RCS using Step 31.c	ENERGIZE ONE Group of PRZR Heaters	MAINTAIN RCS and ruptured SG(s) pressures equal.
GREATER THAN 73% [58%]	DECREASE charging flow	ENERGIZE ONE Group of PRZR Heaters	MAINTAIN RCS and ruptured SG(s) pressures equal.

b. GO To Step 32

(STEP 31 CONTINUED ON NEXT PAGE)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	068 K1.07	
	Importance Rating	2.7	

Knowledge of the interrelations and/or cause-effect relationships between the Liquid Radwaste System and the following: Sources of liquid waste for LRS.

Proposed Question: RO 82

Which ONE (1) of the following describes three sources of liquid waste to the Reactor Coolant Drain Tank?

A. Recirculation sump, Containment sump, Reactor cavity sump

B. Fan cooler leak-off, CCW surge tank, SG blowdowns

C. Non-regenerative heat exchange divert, Chemical Drain Tank, 31 Sump Tank

D. RCS loop drains, RCP seal leak-off, Excess Letdown heat exchanger divert

Proposed Answer: D

Explanation (Optional):

A. Incorrect

B. Incorrect

C. Incorrect

D. Correct

Technical Reference(s): S.D 5.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 2253.a (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

R82

2.0 Detailed Description

2.1 Reactor Coolant Drain Tank (Figure 5.1-1)

The reactor coolant drain tank (RCDT) is a horizontal, cylindrical tank on the 46 foot elevation of Containment inside the crane wall. The tank is constructed of stainless steel and is designed to withstand 25 psig internal, 60 psig external pressure, and a temperature of 367°F. The normal operating pressure is 0.5 to 4.0 psig. The tank has normal operating temperature range of 50°F to 200°F and a capacity of 350 gallons.

The RCDT receives drainage from the following sources:

- Reactor vessel flange leakoff
- Reactor coolant system loop drains (4)
- Number 2 seal leakoff from the reactor coolant pumps (4)
- Safety injection system accumulators (4)
- Excess letdown from the CVCS system
- RHR line to the Containment spray header drain
- Blowdown from instrument racks 19 and 20

The RCDT receives valve packing leakoff from:

- Excess letdown flow control valve HCV-123
- RHR to letdown flow control valve HCV-133
- Pressurizer relief stop valves 535 and 536
- Recirculation pump discharge valves 1802A and 1802B
- RHR heat exchanger outlet valves to spray header 889A and 889B
- Accumulator discharge stop valves 894A, B, C, and D
- RHR suction valves of loop 32 hot leg 730 and 731
- RHR heat exchanger inlet valves 742, 745A and 745B
- RHR heat exchanger outlet valves HCV-638, 747, HCV-640 and 746

Examination Outline Cross-reference:

Level	RO	SRO
Tier #		3
Group #		2
K/A #	G2.2.6	
Importance Rating		3.3

Knowledge of the process for making changes in procedures as described in the safety analysis report.

Proposed Question: SRO 82

According to AP-3, IP3 Procedure Preparation, Review, and Approval, an advanced TPC is for:

A. Intent changes to be incorporated as a subsequent procedure revision

B. Substantive non-intent changes to be incorporated at the next procedure revision

C. Non-intent changes to correct spelling or punctuation, to be incorporated in the next procedure revision

D. Non-intent change to address temporary conditions in the current procedure that will NOT be incorporated in the next procedure revision

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Intent changes are revised immediately
B. Correct.
C. Incorrect. Editorial change
D. Incorrect. Conditional change

Technical Reference(s): AP-3 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 X

Comments:
10CFR55.43(b) item 3 because the SRO must understand the facility change processes

58V

6.7 Temporary Procedure Changes (TPCs)

Expeditious changes to permanent and temporary plant procedures that do NOT result in an increase to the next sequential revision number, do NOT result in a Procedure Intent Change (Definition 6.2), and that are characterized by one of the following types:

6.7.1 Advance TPC

- Changes will be permanently implemented.
- Changes exceed Editorial TPC criteria.

6.7.2 Conditional TPC

- Changes necessary due to a temporary plant condition.
- Changes are removed from procedure following expiration of the specified temporary condition.

6.7.3 Editorial TPC

Changes that only incorporate the following:

- Format changes per IP3-PWM.
- Typographical error corrections.
- Administrative updates (i.e, phone numbers, labels, etc.)
- Modification of Warnings, Cautions, Notes, Precautions, Limitations, Prerequisites, step references, references to other controlled drawings and databases, and other clarification.

6.8 User Validation

A form of procedure review that compares the procedure against field conditions. User Validation should be considered for the following procedure activities and changes:

- New procedures
- General and Partial revisions to procedures that:
  - Are infrequently performed (greater than or equal to 2 years).
  - Manipulate plant equipment or controls.
  - Require multiple departments to implement.
- Addition or deletion of consequential sections, steps or attachments.
- Procedure Intent Changes (Definition 6.2).
- Procedures requiring formal training per Implementation Plans.
- Changes to operator actions during off-normal and emergency conditions.
- Changes to time-critical operator actions (e.g, reactor or turbine trip, etc.)
- Task creations or modifications.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	056 K1.03	
	Importance Rating	2.6	

Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems: MFW.

Proposed Question: RO 83

Given the following conditions:

- The plant is at 95% power.
- All control systems are in their normal automatic alignments
- A Condensate system perturbation causes 33 Condensate pump to trip
- Subsequently, 32 Condensate pump trips.

Assuming no operator action, which ONE (1) of the following describes the response of the plant?

A. Both MBFPs trip on low suction pressure, the reactor will trip on Lo-Lo SG levels

B. Condensate Booster pumps will automatically start and maintain the required Condensate flow. SG levels will drop, then return to the normal band.

C. The MBFP cutback circuitry will act to limit the drop in MBFP suction pressure. The reactor will eventually trip on Lo-Lo SG levels due to the loss of 2 Condensate pumps

D. The MBFP cutback circuitry will act to limit the drop in MBFP suction pressure. As the MBFP speed controllers reduce MBFP speed, a turbine runback will occur and reactor power will stabilize at a lower value

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Only cutback, no trip
B. Incorrect. Condensate Booster Pumps not operated in automatic

C. Correct

D. Incorrect. No automatic runback available

Technical Reference(s): SD-21.0 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1544.e (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

R83

The Advisory Committee on Reactor Safeguards (ACRS) required the Plant to perform a systems interaction study to ensure that adverse system interaction could not degrade plant safety. After the Operating License (OL) was issued the NRC requested licensees conduct system interaction studies as a result of the Three Mile Island accident investigation. System interaction studies were done and demonstrated that the FWS would not compromise the subcriticality function, the shutdown functions, or the integrity of the RCS pressure boundary.

i. Main Steam Line Break with Continued Feedwater Addition

(1) The requirement is that a Main Steam Line Break (MSLB) concurrent with a single failure of a feed reg. valve to close shall not cause containment overpressurization or a return to criticality.

(2) An evaluation was performed and determined that the core remained subcritical and the maximum containment pressure was well below containment design pressure.

C. Detailed Description

1. MBFP suction header. TP-5.3 FW-02

a. Suction Header Instrumentation E.O.5.e

(1) MBFP suction pressure (PT-408B)

This transmitter is used for:

(a) CCR indication (FBF)

(b) Below 325 psig, MBFP suction approaches saturated liquid state E.O.3.c

(c) MBFP suction pressure cutback circuit (NPSH protection) at 315 psig

R83

(2) Pressure Switch (PS-521)
This switch is used to auto start the third condensate booster pump and open the post filter bypass valve. This provides more suction pressure by bypassing the service vessels and starting any available booster pumps. (Occurs at 350 psig)

FW-03
Normal operations is for the CBP to be in TPO

(3) MBFP suction flow element (FE-1102 and FE-1103). These are used by FT-1102-1(31 MBFP) and FT-1102-2 (32 MBFP) to;

E.O.3.d

(a) Provide local flow indication (via flow monitors FM-1102-1 and FM-1102-2

(b) Provide remote CCR indication (FBF) on MBFP suction flow recorder.

(c) Provide low flow protection by FIC-1115 (31 MBFP) and FIC-1116 (32 MBFP) to open the respective MBFP recirc valves on low flow at 3,000 gpm and closes them at 6500 gpm.

E.O.2.d
E.O.5.d

(d) Recirc flow prevents MBFP from attaining near dead-head conditions, which could cause pump heat to create locally saturated conditions in pumps

E.O.3.d

NOTE: Both flow transmitters are powered from 125V AC Distribution Panel 31 (in swap lab)

2. Boiler Feedwater Pumps

TP-5.4
MFW-04

a. Two turbine driven pumps, with oil lubricated pumps and turbines, water sealed shafts, and high pressure oil controls

(1) BFPs are rated for 15,300 GPM @ 4740 RPM and 970 psig (actual plant application: 11645 GPM @ 1111 psia)

E.O.2.a

Examination Outline Cross-reference:

Level	RO	SRO
Tier #		3
Group #		2
K/A #	G2.2.22	
Importance Rating		4.1

Knowledge of LCOs and Safety Limits.

Proposed Question: SRO 83

Given the following conditions:

- The plant is in Mode 5.
- Hydrostatic testing is in progress.
- RCS pressure is inadvertently raised to 2750 psig.

Which ONE (1) of the following states the MAXIMUM amount of time allowed to restore RCS pressure to within the applicable safety limit?

A. 5 minutes

B. 15 minutes

C. 30 minutes

D. 60 minutes

Proposed Answer: A

Explanation (Optional):

A. Correct.
B. Incorrect. Time for notification of states and local gov't.
C. Incorrect. Distractor symmetrical
D. Incorrect. Time for Mode 1 or 2 violation

Technical Reference(s): ITS Section 2.2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not Available (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Facility Bank Previous Audit exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) item 1 and 2 because the SRO must interpret action required for TS and SL violations

IP3 S83

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

In MODES 1 and 2, the combination of THERMAL POWER, Reactor Vessel inlet temperature, and pressurizer pressure shall not exceed the SLs specified in Figure 2.1-1.

2.1.2 RCS Pressure SL

In MODES 1, 2, 3, 4, 5, and in MODE 6 when the reactor vessel head is on, the RCS pressure shall be maintained ≤ 2735 psig.

2.2 SL Violations

2.2.1 If SL 2.1.1 is violated, restore compliance and be in MODE 3 within 1 hour.

2.2.2 If SL 2.1.2 is violated:

2.2.2.1 In MODE 1 or 2, restore compliance and be in MODE 3 within 1 hour.

2.2.2.2 In MODE 3, 4, 5, or 6, restore compliance within 5 minutes.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	002 K5.19	
	Importance Rating	2.6	

Knowledge of the operational implications of the following concepts as they apply to the RCS: Neutron embrittlement.

Proposed Question: RO 84

Which ONE (1) of the following choices makes Indian Point Unit 3 more susceptible to a Brittle Fracture Event over time?

A. Excessive thermal cycling of the pressurizer

B. Weld stress on the vessel head and loop piping connections

C. Neutron bombardment of the reactor vessel

D. Gamma bombardment of the Cold Leg Loop piping

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Thermal stress weakens metals, but neutron bombardment cause brittle failure

B. Incorrect. Vessel head and loop piping are not subjected to as much neutron bombardment

C. Correct

D. Incorrect. Gamma does not cause embrittlement

Technical Reference(s): Rx theory (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		2
	K/A #	G2.2.34	
	Importance Rating		3.2

Knowledge of the process for determining the internal and external effects on core reactivity.

Proposed Question: SRO 84

A reactor startup is being performed 20 hours after a trip from 100% power.

- Estimated Critical Rod Position is Control Bank D at 100 steps
- Criticality is predicted in approximately 5 hours

If the startup was to proceed one hour LATER than scheduled, what is the effect on the 1/M plot data taken during the startup?

The 1/M plot will…

A. ACCURATELY predict criticality at a LOWER rod height
B. ACCURATELY predict criticality at a HIGHER rod height
C. INACCURATELY predict criticality in a CONSERVATIVE direction
D. INACCURATELY predict criticality in a NON-CONSERVATIVE direction

Proposed Answer: A

Explanation (Optional):

A. Correct. Less xenon will mean less poison. Lower rod height for criticality
B. Incorrect. If xenon was building in, it would take more reactivity from rods to get critical
C. Incorrect. 1/m is accurate. ECP may not be
D. Incorrect. 1/m is accurate. ECP may not be

Technical Reference(s): Theory (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	2	
	K/A #	016 K3.04	
	Importance Rating	2.6	

Knowledge of the effect that a loss or malfunction of the NNIS will have on the following: MFW system.

Proposed Question: RO 85

Given the following conditions:

- The plant is at 100% power.
- All control systems are in their normal alignments.
- Instrument Bus 34 loses power and is de-energized

Which ONE (1) of the following describes the effect on the feedwater system?

A. All Main Feed Regulating valves will fail AS IS

B. All Main Feed Regulating valves will fail CLOSED

C. ONLY 34 Feed Regulating Valve will fail AS IS

D. ONLY 34 Feed Regulating valve will fail CLOSED

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Power lost to 3 element controllers, valves will fail closed
B. Correct
C. Incorrect. All 4 valves affected
D. Incorrect. All 4 valves affected

Technical Reference(s): ONOP-EL-3 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5146.4 LIC-ONP-02 (As available)

Question Source: Bank # X
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Facility Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge ______
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

STEP	ACTION\EXPECTED RESPONSE	RESPONSE NOT OBTAINED

(STEP 2 CONTINUED FROM PREVIOUS PAGE)

ACTION\EXPECTED RESPONSE	RESPONSE NOT OBTAINED
b. 32 Instrument Bus Channel I (RED)	b. PERFORM the following: 1) IF AC-MOV-731 has failed closed, THEN PERFORM ONOP-RHR-1, LOSS OF RESIDUAL HEAT REMOVAL FLOW in parallel with this procedure. 2) ENSURE all steam flow and feedwater flow channel transfer switches are in position "B"
c. 33 Instrument Bus Channel IV (YELLOW)	c. ENSURE all main feedwater regulating valves in AUTO.
d. 34 Instrument Bus Channel III (BLUE)	d. PLACE all main feedwater regulating valves in MAN.

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Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		3
	K/A #	G2.3.10	
	Importance Rating		3.3

Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

Proposed Question: SRO 85

The following conditions exist for a job performed on a system:

- The general area radiation levels are 10 mrem/hr
- The hot spot in the room is a pipe elbow that has radiation levels of 100 mrem/hr
- The job will be performed near the hot spot area

Assuming transit time is the same for each case and all shielding placement is done at 100 mrem/hr, which ONE (1) of the following results in the LEAST amount of personnel exposure?

A. Two Radiation Control personnel hang and remove 1 tenth thickness of lead shielding on the hot spot in 1.5 hours on the job. The job is performed after the lead shielding is in place by using 2 operators for 3 hours each.

B. The job is performed by 3 operators for 1 hour each on the job at the hot spot and a fourth operator reading instructions in the general area room for 1 hour.

C. The job is performed by 2 operators for 2 hours each on the job at the hot spot and a third operator reading instructions in the general room area for 2 hours

D. The job is performed by 2 operators for 3 hours each on the job at the hot spot

Proposed Answer: B

Explanation (Optional):

A. Incorrect. 360 mrem total

B. Correct. Lowest total dose of 310 mrem

C. Incorrect. 420 mrem

D. Incorrect. 600 mrem

Technical Reference(s): ALARA program (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: N/A (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43 (b) item 4 because the SRO must know how to minimize exposure for tasks involving High Radiation areas

Examination Outline Cross-reference:

Level	RO	SRO
Tier #	2	
Group #	2	
K/A #	002K6.02	
Importance Rating	3.6	

Knowledge of the effect of a loss or malfunction on the following will have on the Reactor Coolant System (RCS): RCP

Proposed Question: RO 86

While at 20% power with a power ascension in progress, RCP 31 trips due to an overcurrent condition.

No operator action has been taken and no rod motion has occurred.

Which ONE (1) of the following describes the INITIAL reactor and Loop 31 response?

A. A reactor trip WILL occur and Loop 31 Tavg will INCREASE.

B. A reactor trip WILL occur and Loop 31 Tavg will DECREASE.

C. A reactor trip WILL NOT occur and Loop 31 Tavg will DECREASE.

D. A reactor trip WILL NOT occur and Loop 31 Tavg will INCREASE.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Opposite of correct
B. Incorrect. No trip below 40% power
C. Correct.
D. Incorrect. Tavg will decrease

Technical Reference(s): T&AA (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		3
	K/A #	G2.3.2	
	Importance Rating		2.9

Knowledge of facility ALARA program.

Proposed Question: SRO 86

Given the following conditions:

- You are required to make an entry to a Locked High Radiation Area.
- Your year-to-date exposure is 1.6 Rem Total Effective Dose Equivalent (TEDE).
- The job is planned to take 20 minutes to complete with 5 minutes transit time each way.
- Transit path radiation levels are 400 mr/hr.
- Work area radiation levels are 1200 mr/hr.

Which one of the following conditions describes your eligibility to perform this task?

A. You may perform this task provided you are signed onto a High Radiation Area RWP.

B. Special approval is required for this task because you will exceed the site TEDE limit.

C. You may only perform this task if you meet the requirements for a Planned Special Exposure (PSE).

D. You cannot perform the task because your current year to date exposure is already within 80% of the site administrative TEDE limit.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Above site limit of 2 REM
B. Incorrect. Site TEDE will be exceeded. 2Rem
C. Incorrect. PSEs for Emergencies with greater dose

D. Incorrect. 80% met, not exceeded, but NOT a restriction

Technical Reference(s): RE-DOS-8-11 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not Available (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) item 4 because the SRO must determine whether dose will be exceeded in a High Rad area

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	3	
	K/A #	076 K3.07	
	Importance Rating	3.7	

Knowledge of the effect that a loss or malfunction of Service Water will have on the following: ESF loads

Proposed Question: RO 87

The valve lineups were performed to swap the ESSENTIAL Service Water Header from the 34/35/36 Service Water Pumps to the 31/32/33 Service Water Pumps.

HOWEVER, the Service Water Pump MODE selector switch on CCR safeguards panel SBF-1 was inadvertently left in the 4-5-6 position.

Assuming no operator action, which ONE (1) of the following systems WILL be supplied by Service Water if a Safety Injection actuation were to occur?

A. Emergency Diesel Generators.

B. CCW Heat Exchangers.

C. Containment Recirculation Fan Cooling Coils.

D. Instrument Air Compressors.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Essential will not be supplied to EDGs. Wrong pumps will start
B. Correct
C. Incorrect. Wrong pumps will start
D. Incorrect. IAC not supplied if wrong pumps start

Technical Reference(s): SD-24 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 2407 (As available)

Question Source: Bank # X
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge ______
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.45	
	Importance Rating		3.6

Ability to prioritize and interpret the significance of each annunciator or alarm.

Proposed Question: SRO 87

The following alarms have just actuated:

- PROCESS MONITOR HIGH RAD
- COMPONENT COOLING SURGE TANK LEVEL
- THERMAL BARRIER CCW HEADER LOW FLOW

What ONE (1) of the following procedures will be used to respond to this event?

A. ONOP-RCS-5, Reactor Coolant Pump Malfunction

B. ONOP-RM-1, Failure of Radiation Monitor

C. ONOP-CC-1, Loss of Component Cooling

D. ONOP-CC-2, Leakage into the Component Cooling System

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Alarm combination leads to D. Seal problem or temperature problem leads to A
B. Incorrect. No indication of rad monitor failure
C. Incorrect. Alarms available suggest that CCW surge tank level will rise, not drop
D. Correct

Technical Reference(s): ONOP-CC-2 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 6162 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:
10CFR55.43(b) item 5 because the SRO must determine procedure direction based upon plant condition presented

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Number:	Title:	Revision Number:
ONOP-CC-2	LEAKAGE INTO THE COMPONENT COOLING SYSTEM	12

NOTE

Events covered by this procedure may lead to implementation of the Emergency Plan and classification using the Emergency Plan Volume II, Table 4-1.

1.0 PURPOSE

This procedure provides guidance for operator response to leakage into the CCW system.

2.0 SYMPTOMS/ENTRY CONDITIONS

Any one or more of the following may be indicative of this off normal condition:

- PROCESS MONITOR HIGH RAD. - category alarm.
- COMPONENT COOLING SURGE TANKS (31 OR 32) LEVEL alarm.
- THERMAL BARRIER CCW HEADER LOW FLOW alarm.
- RCP THERMAL BARRIER COOLING RETURN HIGH TEMP. alarm.
- Rising Component Cooling Surge Tank levels.
- Low thermal barrier delta P.
- Abnormal temperature or flow indications associated with Component Cooling System or equipment served by it.

3.0 AUTOMATIC ACTIONS

3.1. AC-FCV-625, RCP CCW Thermal Barrier Return Isolation, closes on a high flow of 175 gpm with a subsequent CCW header low flow alarm.

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Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	3	
	K/A #	045 A1.06	
	Importance Rating	3.3	

Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the MT/G system controls including: Expected response of secondary plant parameters following T/G trip.

Proposed Question: RO 88

Given the following conditions:

- The plant was operating at 78% power.
- All Service Water Cooling was lost.
- All Circulating Water pumps were tripped.
- All equipment functioned as designed.
- The CRS has directed transition to ES-0.1, Reactor Trip Response

Which ONE (1) of the following describes the approximate Tavg 10 minutes following the reactor trip?

A. 544°F

B. 547°F

C. 550°F

D. 555°F

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Close to Low Tave/Reactor trip feed isolation setpoint
B. Incorrect. Normal no load value
C. Correct

D. Incorrect. Would be on safety valves. Atmospherics are available

Technical Reference(s): Steam Tables (Attach if not previously provided)

Proposed References to be provided to applicants during examination: Steam Tables

Learning Objective: Not available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.24	
	Importance Rating		3.7

Knowledge of loss of cooling water procedures.

Proposed Question: SRO 88

Given the following conditions:

- The team has entered ONOP-RW-1, Service Water Malfunction, due to low Service Water pressure in the essential header.
- Backup Service Water pump 37 has been started to restore pressure.
- While looking for the problem, the Essential Service Water header pressure slowly continues to decrease.

Which ONE (1) of the following actions will be taken next?

A. Trip the reactor and enter E-0, Reactor Trip or Safety Injection.

B. Start 38 Service Water pump using ONOP-RW-1, Service Water Malfunctions.

C. Start 39 Service Water pump using ONOP-RW-1, Service Water Malfunctions.

D. Commence a unit shutdown using ONOP-TG-3, Rapid Shutdown.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Not at the point where trip is required
B. Incorrect. Not normally started for loss of SW
C. Correct
D. Incorrect. Try other pumps first

Technical Reference(s): ONOP-RW-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5475 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must assess plant conditions and determine procedure usage based upon the conditions presented

S8

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

4.0. **INITIAL OPERATOR ACTION**

NOTE

- The backup service water pumps cannot be utilized to satisfy Technical Specification LCO 3.7.9 requirement of three essential service water pumps.
- The Operating pressure band for the Back-up Service Water Pumps is 75-110 PSIG.

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STEP / ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1. *VERIFY Service Water header(s) pressure is adequate for plant loads – GREATER than 60 psig.*	Start additional service water pumps as necessary on that header, then investigate cause for low pressure • IF necessary START a backup service water pump (37 or 39) to restore pressure • START back-up service water pump 38 on alternate feed as per SOP-EL-12. • IF pressure loss is due to inadequate pump suction supply THEN OPEN Service Water Pump Bay Bypass Gates
2. CHECK Service Water pressure in BOTH headers GREATER than 60 psig	GO TO Step 4.
3. RETURN TO Procedure and Step in effect.	

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	3	
	K/A #	076 K2.01	
	Importance Rating	2.7	

Knowledge of bus power supplies to the following: Service water.

Proposed Question: RO 89

31, 32, and 33 Service Water pumps are aligned to the Essential Service Water header.

Which ONE (1) of the following states the power supplies aligned to the associated Zurn strainers?

A. MCC 312A

B. MCC 37 and 39

C. MCC 36A or 36B

D. 480 volt bus 5A, 2A and 6A

Proposed Answer: C

Explanation (Optional):

A. Incorrect.
B. Incorrect
C. Correct
D. Incorrect

Technical Reference(s): SOP-RW-1 (Attach if not previously provided)
SD-24

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 1406.c (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

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Local control panel indications include a red light that indicates a high strainer Δp of approximately 7 psid and an amber light that indicates that the strainer motor operation is defeated. A 0-18 psid differential pressure gauge is also provided (normal is $\approx$4 psid). Because the control panels are subjected to the environment, thermostatically controlled electric heaters are installed for freeze protection. The strainer differential pressure sensing lines and gauges are also electrically heated for freeze protection. The Zurn Strainer Pit Temperature Monitor alarms at 45°F. At this temperature, Operations personnel has time to provide temporary heaters to prevent component freezing.

The strainers are considered essential for safeguards operation. Strainers 31, 33 and 35 are powered from MCC-36A and strainers 32, 34, and 36 are powered from MCC-36B. The backup strainers (37, 38 and 39) can be powered from either MCC-36A or MCC-36B using a throw switch. The throw switch is located on the north wall of the 15-ft. elevation of the Control Building.

2.2 Essential Service Water Supply

During operation, the Service Water System is split with one set of pumps supplying essential loads and the other supplying the non-essential loads (Figure 24-2). The Backup Service Water pump discharge header is connected to each of the Service Water headers for the nuclear side components. The valves used to perform this alignment are located in the Backup Service Water valve pit located outside at the NW corner of the Turbine Hall. The Backup Service Water supply was not designed to provide a cooling water supply to the conventional plant equipment nor the non-essential loads on the nuclear side.

Both the Service Water and Backup Service Water supplies to the Nuclear side components header contain check valves and hand-operated butterfly valves upstream of the point they are joined to prevent backflow from one system to the other. Downstream of this header connection, PT-1190 and PT-1191 transmit signals for Control Room alarms and pressure indications located on panel SJF. Pressure instrument PI-1190 provides header pressure indication for the header supplied by pumps 31, 32, 33 and PI-1191 provides header pressure indication for pumps 34, 35, 36.

The "SERVICE WTR. HDR. (31, 32, 33) HIGH/LOW PRESS" alarm is set at 97.5 psig and 60 psig respectively, on Control Room panel SJF as sensed by PC-1112AS (low) and PC-1112BS (high). Similarly, the

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		3
	Group #		4
	K/A #	G2.4.12	
	Importance Rating		3.9

Knowledge of general operating crew responsibilities during emergency operations.

Proposed Question: SRO 89

Given the following conditions:

- Reactor has tripped and SI is initiated.
- Due to some ECCS problems, core cooling is diminished.
- The crew is performing the actions of E-1, Loss of Reactor Coolant.
- RCS pressure is 1400 psig and stable.
- PZR level is off-scale low.
- All SG NR levels are between 15-20%.
- 31, 32, 33 SG pressures are approximately 1020 psig and stable.
- 34 SG pressure is 1140 psig and slowly rising.

Which ONE (1) of the following describes the appropriate action?

FR-H.2, Response to Steam Generator Overpressure,....

A. MUST be entered and performed until 34 SG pressure is returned to within limits or until a higher priority condition develops.

B. MAY be entered at CRS discretion. If entered, it MUST be performed to completion.

C. MUST be entered and performed to completion unless a higher priority condition exists.

D. MAY be entered or exited at CRS discretion.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Yellow path not required
B. Incorrect. May exit at CRS discretion
C. Incorrect. Yellow does not have to be entered

Technical Reference(s): EOP Users guide (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: EOP 01 1.1.5 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 X

Comments:
10CFR55.43(b) item 5 because the SRO must assess condition of plant and determine appropriate procedural direction

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4.5.4.1 RED Path

IF a RED condition exists, THEN immediately stop any Optimal Recovery Procedure (ORPs; i.e., ESs and ECAs) actions in progress (i.e., DO NOT complete the step in progress) AND perform the Function Restoration Procedure (FRP) required by the RED condition. The exception to this was stated previously in Section 4.5.1.

IF during the performance of a RED condition FRP, another RED condition of higher priority as listed in Section 4.5.2 arises, THEN the higher priority condition SHALL be addressed first AND the lower priority condition FRP suspended.

4.5.4.2 ORANGE Path

IF an ORANGE exists, THEN monitor all of the remaining status trees. IF no RED condition exists, THEN suspend any ORP in progress and perform the FRP required by the ORANGE condition. The exception to this was stated previously in Section 4.5.1.

IF during the performance of an ORANGE condition FRP, a RED condition OR higher priority ORANGE condition arises, THEN the RED or higher priority ORANGE condition SHALL be addressed first, and the original ORANGE condition FRP suspended. IF a FRP specifically states that a higher priority condition should NOT be addressed, THEN this requirement does NOT apply.

4.5.4.3 YELLOW Path

A YELLOW terminus does not require prompt operator attention. Frequently it is indicative of an off-normal and/or temporary condition which will be restored to normal status by actions already in progress. In other cases the YELLOW status might provide an early indication of a developing RED or ORANGE condition. Following FRP implementation, a YELLOW might indicate a residual off-normal condition. The operator is allowed to decide whether or not to implement any YELLOW-condition FRP. However, specific requirements that may be contained in a YELLOW-condition FRP cannot be ignored.

Example: 1st caution in FR-H.3 not to steam a SG w/High Level.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	
	Group #	3	
	K/A #	008 K3.01	
	Importance Rating	3.4	

Knowledge of the physical connections and/or cause-effect relationships between the CCWS and the following: Loads cooled by CCWS.

Proposed Question: RO 90

TCV-130, Component Cooling Water Return from the Non-Regenerative Heat Exchanger Temperature Control Valve, fails due to a broken air line.

Assuming no action by the team, which ONE (1) of the following describes the effect of this failure on the plant?

A. Letdown temperature goes up; the rise in letdown temperature causes the letdown demineralizers to remove less boron, resulting in a minor dilution.

B. Letdown temperature goes down; the decrease in letdown temperature causes the letdown demineralizers to remove more boron, resulting in a minor dilution.

C. Letdown temperature goes up; the rise in letdown temperature causes the letdown demineralizers to remove less boron, resulting in a minor boration.

D. Letdown temperature goes down; the decrease in letdown temperature causes the letdown demineralizers to remove more boron, resulting in a minor boration.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Letdown temperature goes down
B. Correct.
C. Incorrect. Letdown temperature goes down
D. Incorrect. Dilution will occur

Technical Reference(s): Theory (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

ATTACHMENT 1
VALVE FAIL POSITIONS

(Page 3 of 10)

5.1.4. **Component Cooling System:**

- Excess letdown heat exchanger component cooling isolation valves AC-AOV-796, 793, 798, 791, fail closed.
- Non-regenerative heat exchanger temperature control valve, AC-TCV-130, fails open.

5.1.5. **Service Water System:**

- Fan cooler unit service water flow control valves,
  SWN-TCV-1103, SWN-TCV-1104 and SWN-TCV-1105, fail open.
- Diesel generator service water flow control valves,
  SWN-FCV-1176 and SWN-FCV-1176A, fail open.
- 31 & 32 IACC Heat Exchangers outlet temperature control valve, SWN-TCV-1113, fails open.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	E10 G2.4.50	
	Importance Rating		3.3

Ability to identify system alarm setpoints and operate controls identified in the alarm response manual

Proposed Question: SRO 90

Given the following conditions:

- A reactor trip has occurred due to a loss of off-site power.
- RCPs are tripped.
- The team is performing actions of ES-0.2, Natural Circulation Cooldown.
- RVLIS is NOT available.
- The team has commenced RCS depressurization to 1890 psig.
  - RCS pressure is 2080 psig and Trending DOWN.
  - RCS Tavg is 548°F and STABLE.
  - PRESSURIZER LOW LEVEL, on panel SAF, has alarmed.
  - Pressurizer Level is 5% and Trending DOWN.

Which ONE (1) of the following actions will be required?

A. Continue depressurization to 1890 psig and block SI.

B. Initiate Safety Injection and go to E-0, Reactor Trip or Safety Injection.

C. Stop the cooldown, Block SI, and initiate depressurization to 1890 psig.

D. Stop the depressurization and go to ES-0.4, Natural Circulation with Steam Void in Vessel, without RVLIS.

Proposed Answer: B

A. Incorrect. Continuous Action requires SI initiation
B. Correct.
C. Incorrect. SI blocked when 1890 psig is reached.
D. Incorrect. If steam voids were formed, they would cause pressurizer level to rise, not drop.

Technical Reference(s): ES-02, Foldout (Attach if not previously provided)
ARP-SAF

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5367 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:
10CFR55.43(b) item 5 because the SRO must assess plant conditions and determine appropriate course of action

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FOLDOUT PAGE FOR ES-0.2

1. SI ACTUATION CRITERIA:

IF EITHER condition listed below occurs, actuate SI AND go to E-0, REACTOR TRIP OR SAFETY INJECTION, Step 1:

o PRZR level - CANNOT BE MAINTAINED GREATER THAN 9%

o RCS subcooling based on core exit TCs - LESS THAN VALUE OBTAINED FROM TABLE:

WR RCS PRESSURE (PSIG)	RCS SUBCOOLING °F
0 - 400	52
401 - 800	36
801 - 1200	23
1200 - 2500	19

2. AFW SUPPLY SWITCHOVER CRITERION:

IF CST level decreases to less than 2 ft, switch to city water supply.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.2	
	Importance Rating	3.0	

Knowledge of operator responsibilities during all modes of plant operation.

Proposed Question: RO 91

AP-21, Conduct of Operations, describes the "Departure From License Condition" which can be invoked to protect the health and safety of the public.

Which of the following conditions must ALWAYS be met when departing from a license condition or technical specification in accordance with 10 CFR 50.54 (x) and (y)?

A. The action must be necessary to prevent equipment damage.

B. The action must be approved by a licensed SRO prior to taking the action.

C. The NRC must be notified prior to the action and must concur with the action to be taken.

D. The action must be approved by the Plant Manager when the action is necessary to protect plant personnel.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Protection of personnel and public is priority

B. Correct.

C. Incorrect. NRC does not have to concur

D. Incorrect. Plant Manager approval not required

Technical Reference(s): AP-21, Section 4.6 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank
Previous Audit
Exam

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

4.5.4 Event Recollection Forms shall be filled out from all involved individuals, ensuring sufficient detail, prior to leaving work when the examples of the following events have occurred:

- plant trips or transients
- human performance errors (HPE) or potential HPE
- unplanned or non-routine radiological releases
- injuries or radiological exposures that need medical assistance
- plant or site fires
- security threats
- as the Shift Manager determines

4.6 Departure from License Condition

4.6.1 In accordance with 10 CFR 50.54 (x) and (y):

- Station personnel may take reasonable action that departs from a license condition or a Technical Specification in an emergency when this action is immediately needed to protect the public health and safety and no action consistent with license conditions and Technical Specifications that can provide adequate or equivalent protection is immediately apparent. This action must be approved, as a minimum, by a licensed Senior Reactor Operator prior to taking the action.

4.6.2 This provision applies only to those emergency situations during which compliance with the license poses a barrier to effective protective action and immediate action is needed to protect the public health and safety and the personnel on site.

4.6.3 This provision does NOT apply in circumstances where time is available for a Technical Specification or a License Condition amendment to be approved by the NRC.

4.6.4 The use of this provision does not require concurrence of NRC personnel.

4.6.5 IF time permits, THEN notification to the NRC Operations Center by telephone shall be performed before the action is taken. Otherwise, it shall be made as soon as possible thereafter.

4.6.6 All emergency actions taken shall be documented in the Unit Log.

4.6.7 The immediate threat of injury to personnel is an appropriate justification for use of this provision.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	029 EA2.02	
	Importance Rating		4.4

Ability to determine or interpret the following as they apply to ATWS: Reactor trip alarm.

Proposed Question: SRO 91

Following a load rejection from 100% to 60% power, the crew is attempting to stabilize the plant.

- The RO reports that a 'Pressurizer Pressure High' first out annunciator on Panel FDF.
- Indications exist that the Pressurizer PORVs have opened
- Pressurizer pressure spiked to approximately 2370 psig and is now dropping rapidly
- The reactor and turbine remain on-line

Which ONE (1) of the following actions is required next?

A. Stabilize the plant at 60% power. Initiate boration for AFD control.

B. Trip the reactor, enter E-0, Reactor Trip or Safety Injection

C. Trip the reactor, enter FR-S.1, Response to Nuclear Power Generation/ATWS

D. Verify the PORVs have closed. Close the PORV block valves. Monitor RCS pressure for Reactor Trip and Safety Injection initiation setpoints

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Trip setpoint on PRZR pressure was exceeded
B. Correct
C. Incorrect. If the reactor trips, no need to enter FR-S.1
D. Incorrect. Will be done in E-0

Technical Reference(s): E-0 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5250 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) item 5 because the SRO must assess conditions and choose an appropriate course of action

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	2	
	K/A #	G2.2.12	
	Importance Rating	3.0	

Knowledge of surveillance procedures.

Proposed Question: RO 92

You have been directed to perform a Surveillance Test that is part of a Post Maintenance Test (PMT).

Which ONE (1) of the following describes a condition where a step in the Surveillance Test may be marked 'N/A'?

A. To change the conditions or intent of the test.

B. A precaution or limitation of a test is not applicable.

C. To designate components that are not being used as part of the PMT.

D. To identify required components that are out of service during the performance of a test.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Using N/A to change conditions or ignore precautions is forbidden.
B. Incorrect. Using N/A to change conditions or ignore precautions is forbidden.
C. Correct. N/A should be used when performing partial STs to designate components that will not be used in the ST
D. Incorrect. If required equipment is OOS, the OOS should be marked next to the step as well as action taken in the ST 'comments' section

Technical Reference(s): Not available (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # X
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis ______

10 CFR Part 55 Content: 55.41 X
55.43 ______

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	E08 EA2.1	
	Importance Rating		3.7

Ability to operate and/or monitor the following as they apply to the (Pressurized Thermal Shock): Facility conditions and selection of appropriate procedures during abnormal and emergency operations.

Proposed Question: SRO 92

Given the following conditions:

- A LOCA has occurred.
- The team is performing actions contained in E-1, Loss of Reactor or Secondary Coolant.
- The following conditions currently exist:
  - All SI equipment is operating as required.
  - RCS pressure is 80 psig.
  - The STA informs you of the following CSF Orange conditions:
    - Integrity
    - Containment

Which ONE (1) of the following describes the correct response to these indications?

A. Enter FR-P.1, Response to Imminent Pressurizer Thermal Shock Condition. Take action to stop RCS cooldown and reduce RCS pressure. When directed, enter FR-Z.1, Response to High Containment Pressure.

B. Enter FR-P.1, Response to Imminent Pressurizer Thermal Shock Condition. Ensure RHR flow is consistent with RCS pressure. Transition to FR-Z.1, Response to High Containment Pressure.

C. Enter FR-Z.1, Response to High Containment Pressure. When action is complete, transition to FR-P.1, Response to Imminent Pressurizer Thermal Shock Condition. Take action to stop RCS cooldown and reduce RCS pressure, then return to E-1.

D. Enter FR-Z.1, Response to High Containment Pressure. When action is complete, transition to FR-P.1, Response to Imminent Pressurizer Thermal Shock Condition. Ensure RHR flow is consistent with RCS pressure, then return to E-1.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. FR-P.1 actions do not apply if RCS pressure is low and RHR flow is high. A PTS event is not imminent

B. Correct.

C. Incorrect. FR-P.1 is higher priority than FR-Z.1

D. Incorrect. FR-P.1 is higher priority than FR-Z.1

Technical Reference(s): FR-P.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: EOP 01 1.1.5 , 5773 (As available)

Question Source: Bank # X

Modified Bank # ______ (Note changes or attach parent)

New ______

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge ______

Comprehension or Analysis Comp

10 CFR Part 55 Content: 55.41 ______

55.43 X

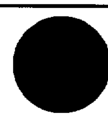
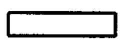
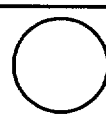
Comments:

10CFR55.43(b) item 5 because the SRO must evaluate conditions, determine appropriate procedure sequence, and also use of applicable procedures

S9V

4.5.3 Color-Coding of CSF Status Trees

At any given time, a CSF status is represented by a single path through its tree. Since each path is unique, it is uniquely labeled at its end point, or terminus. This labeling consists of color-coding and/or line-pattern-coding of the terminus and last branch line, plus a transition to an appropriate procedure if required by that safety status. <u>IF</u> the status is normal for a particular CSF, <u>THEN</u> no transition is specified, and the condition is clarified by the words CSF SAT. CSF Status Trees color/symbol coding priorities are listed below:

COLOR	LINE CODE	SYMBOL CODE	STATUS/RESPONSE
RED			The critical safety function is under <u>extreme challenge:</u> immediate operator action is required.
ORANGE			The critical safety function is under <u>severe challenge:</u> prompt operator action is required.
YELLOW			The critical safety function condition is <u>off–normal.</u> Operator action may be taken.
GREEN			The critical safety function is satisfied. No operator action is needed.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	1	
	K/A #	G2.1.18	
	Importance Rating	2.9	

Ability to make accurate, clear and concise logs, records, status boards, and reports.

Proposed Question: RO 93

In accordance with OD-36, Operator Rounds and Log sheets, who, by position, is responsible for the Weld Channel Calculation?

A. Reactor Operator

B. Balance of Plant operator

C. Control Room Supervisor

D. Shift Technical Advisor

Proposed Answer: A

Explanation (Optional):

A. Correct. Per procedure
B. Incorrect.
C. Incorrect.
D. Incorrect.

Technical Reference(s): OD-36 section 5.4 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank Editorial Mods
Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

RO 93

5.4 Reactor Operators (ROs)

5.4.1 Retain control room daily surveillances in accordance with this directive.

5.4.2 Promptly inform the CRS of any out-of-specification readings, abnormal trends, or unexpected plant or equipment conditions.

5.4.3 Maintain the Control Room Annunciator Tracking Log in accordance with this Directive.

5.4.4 The RO is responsible for maintaining the Unit Log and the High Tension Log. The RO is responsible for Flight Panel manipulations, alarms and ARP responses, but may be assisted and can assist the BOP.

5.4.5 The BOP is responsible for the Control Room Log readings, special logs and maintaining charts and light bulbs (annunciator and indicating).The BOP is responsible for Supervisory Panel and other CR control panel manipulations, alarms and ARP responses. The BOP can assist the RO in Flight Panel items.

5.5 Shift Technical Advisor (STA)

5.5.1 Periodically review completed daily surveillances for equipment performance trends and promptly inform the SM and OM of any abnormal trends identified.

5.6 Nuclear Plant Operators (NPOs)

5.6.1 Perform operator rounds and daily surveillances in accordance with this directive.

5.6.2 Promptly inform the CRS of any out-of-specification readings, abnormal trends, or unexpected plant or equipment conditions.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	059 AA2.02	
	Importance Rating		3.9

Ability to determine and interpret the following as they apply to the Accidental Liquid Radwaste Release: The permit for liquid radioactive-waste release.

Proposed Question: SRO 93

You are preparing a Liquid Waste Release Permit in accordance with SOP-WDS-14, Liquid Waste Releases.

R-18, liquid effluent process monitor, fails its source check.

Which of the following describes the actions necessary to authorize the release?

A. Chemistry must be requested to draw two samples, approximately 15 minutes apart. The release calculations must be independently verified prior to approval of the permit.

B. Chemistry must be requested to draw two samples. The time to release the tank and the volume released must be independently verified before the permit can be approved.

C. Perform a source check on R-18 channel 2. If the source check is satisfactory, the permit may be approved.

D. The permit may not be approved until R-18 is restored to operable status. Volume of liquid to be released must be recirculated a minimum of 2 hours and all calculations performed prior to release.

Proposed Answer: A

Explanation (Optional):

A. Correct
B. Incorrect. Calculations are for activity and release rate
C. Incorrect. Channel 2 is not used
D. Incorrect. R-18 need not be operable to release, but compensatory measures must be in place

Technical Reference(s): SOP-WDS-14 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 2261 (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) items 4 and 5 because the SRO must know the requirements for approval of radioactive release to unrestricted waters

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	3	
	K/A #	G2.3.4	
	Importance Rating	2.5	

Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

Proposed Question: RO 94

Given the following conditions:

- Mode 1 at 100% when a LBLOCA occurred.
- A General Emergency has been in effect for 6 hours.

Which ONE (1) of the following is the TEDE limit for performing Life-Saving actions?

A. 5 Rem

B. 25 Rem

C. 75 Rem

D. 250 Rem

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Annual TEDE limit
B. Correct. Lifesaving action 25 Rem
C. Incorrect.
D. Incorrect

Technical Reference(s): E-Plan (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source:	Bank #	X	
	Modified Bank #		(Note changes or attach parent)
	New		

Question History: Vendor Bank Previous NRC

Question Cognitive Level:	Memory or Fundamental Knowledge	X
	Comprehension or Analysis	

10 CFR Part 55 Content:	55.41	X
	55.43	

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #	069 AA2.02	
	Importance Rating		4.4

Ability to determine and interpret the following as they apply to the Loss of Containment Integrity: Verification of automatic and manual means of restoring integrity.

Proposed Question: SRO 94

Given the following conditions:

- The plant is operating at 100% power.
- Work performed on SI-AOV-1813 requires a Post Maintenance Retest.
- SI-878A, 31 Spray Pump Discharge Test Isolation, must be opened for the retest. It is a locked closed, non-automatic containment isolation valve

Which ONE (1) of the following is required to open SI-878A to perform the retest?

A. CRS or SM approval only, since the valve is part of a line open to containment during normal operations

B. An approved Temporary Change is required for the off-normal valve position.

C. A Dedicated Operator must be stationed at the valve to close it in the event of an emergency

D. It must be inside of a tagged boundary to be opened above Mode 5.

Proposed Answer: C

Explanation (Optional):

A. Incorrect. CRS or SM must approve, but not only conditions
B. Incorrect. No TC required if governed by procedure
C. Correct
D. Incorrect. Tagged boundary may still be open to containment

Technical Reference(s):	SOP-CB-1	(Attach if not previously provided)
	TS	

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source:	Bank #		
	Modified Bank #	X	(Note changes or attach parent)
	New		

Question History: Facility Bank

Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	X

10 CFR Part 55 Content:	55.41	
	55.43	X

Comments:

10CFR55.43(b) item 2 because the SRO must be aware of Technical Specification actions for Containment Integrity requirements

594

4.5 Critical Safety Function (CSF) Status Trees

Status Trees are a device used to evaluate the current state of predefined CSF. Status Trees ask a series of questions about plant conditions, and in general, each question asked depends on the answer to the previous question. This dependency results in a branching pattern, which is referred to as a "tree." Control Room personnel can begin monitoring status trees at any time after EOPs are entered; however, certain rules apply to implementation of the Function Restoration (FRP) procedures. Monitoring of the CSF Status Trees SHALL begin when:

- Directed by E-0, REACTOR TRIP OR SAFETY INJECTION, to begin monitoring CSF Status Trees
- Exiting E-0, REACTOR TRIP OR SAFETY INJECTION

Instructions for CSF status trees are also defined in the pages following the cover sheet of the F-0 procedure.

4.5.1 ORPs Requiring Priority Over FRPs

Certain contingency EOPs take precedence over the FRPs due to specific initiating events. These procedures are identified by a note at the beginning of the EOP:

- ECA-0.0 LOSS OF ALL AC POWER
- ECA-0.1 LOSS OF ALL AC POWER RECOVERY WITHOUT SI REQUIRED (see ECA-0.1, Step 1, NOTE)
- ECA-0.2 LOSS OF ALL AC POWER RECOVERY WITH SI REQUIRED (see ECA-0.2, Step 1, NOTE)
- ES-1.3 TRANSFER TO COLD LEG RECIRCULATION (see ES-1.3, Step 1, NOTE)

4.5.2 Priorities of CSF Status Trees

There are 6 different trees, each evaluating a separate safety aspect (CSF) of the plant. CSF Status Trees are listed below in order of priority from highest to lowest:

SUBCRITICALITY	(S)	(i.e., F-0.1)
CORE COOLING	(C)	(i.e., F-0.2)
HEAT SINK	(H)	(i.e., F-0.3)
INTEGRITY	(P)	(i.e., F-0.4)
CONTAINMENT	(Z)	(i.e., F-0.5)
INVENTORY	(I)	(i.e., F-0.6)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.14	
	Importance Rating	3.0	

Knowledge of general guidelines for EOP flowchart use.

Proposed Question: RO 95

Which ONE (1) of the following describes the EOP implementation hierarchy in the event of a reactor trip concurrent with a loss of AC power to all AC Emergency Busses?

A. Enter ECA-0.0, Loss Of All AC Power directly. Suspend actions in ECA-0.0 and enter the appropriate FRP only upon a CSF Status Tree RED path condition.

B. Enter ECA-0.0, Loss Of All AC Power directly and regardless of the CSF Status Trees, continue in ECA-0.0 until AC power is restored to the AC emergency busses.

C. Transition to ECA-0.0, Loss Of All AC Power from E-0, Reactor Trip Or Safety Injection. Suspend actions in ECA-0.0 and enter the appropriate FRP only upon a CSF Status Tree RED path condition.

D. Transition to ECA-0.0, Loss Of All AC Power from E-0, Reactor Trip Or Safety Injection. Suspend actions in ECA-0.0 and enter the appropriate FRP upon any CSF ORANGE or RED path condition.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Because no AC powered safeguards equipment is available, FRPs cannot be implemented. Remain in ECA-0.0 until power is restored.
B. Correct.
C. Incorrect. ECA-0.0 is entered directly.
D. Incorrect. ECA-0.0 is entered directly.

Technical Reference(s): EOP User's Guide (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: EOP 1.1.3 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	007 G2.1.14	
	Importance Rating		3.3

Conduct of Operations: Knowledge of system status criteria, which require the notification of plant personnel.

Proposed Question: SRO 95

Given the following conditions:

- The plant is in Mode 6
- Refueling is in progress
- The Refueling SRO reports damage to an irradiated fuel assembly on the Refueling Crane mast

Which ONE (1) of the following is required to be performed immediately?

A. Evacuate Containment

B. Start the Iodine Filter Fans and initiate containment isolation

C. Initiate CVCS Letdown Purification IAW ONOP-CVCS-2

D. Ensure charcoal filter bed inlet and outlet dampers have opened and install the charcoal bypass upper and lower blocking assemblies

Proposed Answer: A

Explanation (Optional):

A. Correct
B. Incorrect. Not immediate
C. Incorrect. Not immediate
D. Incorrect. Not immediate

Technical Reference(s): ONOP-RP-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5487 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:

10CFR55.43(b) items 4 and 5 because the SRO must know the requirements for evacuation of containment when high radiation exposure may result

4.0 INITIAL OPERATOR ACTION

4.1 Ensure that the proper automatic actions have occurred.

4.2 Initiate immediate evacuation of all personnel from containment.

5.0 SUBSEQUENT ACTION

NOTE

For direction on the classification of the events, refer to "Initiating Conditions and Emergency Action Levels", Vol. II of the emergency plan.

5.1 Reduce containment airborne activity level by running the iodine filter fans. Direct the chemist and HP to sample and analyze the RCS and containment atmosphere. If necessary, purge containment as per SOP-CB-3.

5.2 If necessary, reduce refueling cavity water activity by placing the CVCS letdown purification path in service as per SOP-CVCS-2.

5.3 When re-entry into containment is permitted, the SM and Refueling SRO shall investigate the incident and evaluate the condition of the irradiated fuel assembly. The following conditions are to be considered:

5.3.1 Does the damaged fuel assembly present an immediate hazard to personnel?

5.3.2 Does the damaged fuel assembly present an immediate hazard to additional fuel assemblies?

5.3.3 Can the damaged fuel assembly be placed in a storage location and/or can it be removed?

5.4.0 Maintain the refueling cavity and refueling canal flooded and the damaged fuel assembly under water.

5.5.0 Allow general access into containment only after the fuel assembly is in a safe condition and an airborne evaluation has been completed and determined to be acceptable.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	3	
	Group #	4	
	K/A #	G2.4.34	
	Importance Rating	3.8	

Knowledge of RO tasks performed outside the main control room during emergency operations including system geography and system implications.

Proposed Question: RO 96

WHICH ONE of the following states the basic actions required to start 32 Charging Pump when a fire in the Control Room requires a plant shutdown using the Alternate Safe Shutdown Equipment?

A. Transfer 32 Charging Pump to Alternate Feed using transfer switch on MCC-312A, close disconnect switch on MCC-312A, and start pump using local control switch in 32 Charging Pump Room.

B. Transfer 32 Charging Pump to Alternate Feed at transfer cabinet in 32 Charging Pump Room, close disconnect switch in 32 Charging Pump Room, and start pump using local control switch in 32 Charging Pump Room.

C. Transfer 32 Charging Pump to Alternate Feed using transfer switch on MCC-312A, close disconnect switch in 32 Charging Pump Room, and start pump using key-switch on MCC-312A.

D. Transfer 32 Charging Pump to Alternate Feed at transfer cabinet in 32 Charging Pump Room, close disconnect switch on MCC-312A, and start pump using key-switch on MCC-312A.

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Transfer switch wrong location
B. Incorrect. Pump start wrong location
C. Incorrect. Transfer switch wrong location
D. Correct.

Technical Reference(s): ONOP-FP-1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: Not available (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Facility Bank

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	E03 EA1.02	
	Importance Rating		3.9

Ability to operate and/or monitor the following as they apply to the (LOCA Cooldown and Depressurization): Operating behavior characteristics of the facility.

Proposed Question: SRO 96

Given the following:

- A small break LOCA has occurred. The team is in ES-1.2, Post LOCA Cooldown And Depressurization.
- RCS subcooling is adequate. The team has determined that one SI pump can be stopped.

Which ONE (1) of the following explains what will happen to the value of subcooling when the selected SI pump is stopped?

A. Lowers because break flow remains constant while ECCS flow is reduced. RCS temperature rises and stabilizes at a higher value.

B. Lowers as RCS pressure lowers in response to reduced ECCS flow. Stabilizes at a lower value when break flow equals ECCS flow.

C. Remains the same. Flow from the running SI pump rises, reaching a balance with break flow.

D. Remains the same. RCS temperature rises in response to the reduced ECCS flow, but RCS pressure also rises.

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Temperature is controlled by steam dump and is not expected to rise.

B. Correct.

C. Incorrect. Subcooling is reduced as a result of lower ECCS flow.

D. Incorrect. Temperature does not rise.

Technical Reference(s): ES-1.2 background (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5599 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis Comprehension

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	E04 EK1.3	
	Importance Rating	3.5	

Knowledge of the operational implications of the following concepts as they apply to the (LOCA Outside Containment): Annunciators and conditions indicating signals, and remedial actions associated with the (LOCA Outside Containment).

Proposed Question: RO 97

Which ONE (1) of the following Unit 3 Radiation Monitoring System channels in alarm will require action IAW ECA-1.2, LOCA Outside Containment?

A. R-5, Fuel Storage Building area monitor
B. R-16A, FCU Common Discharge Liquid monitor
C. R-15, Condenser Air Ejector effluent process monitor
D. R-14, Plant Vent Radiogas monitor

Proposed Answer: D

Explanation (Optional):

A. Incorrect. No connection to ECA-1.2, only fuel handling
B. Incorrect. No connection to ECA-1.2, is a process alarm for service water
C. Incorrect. E-3 transition criteria
D. Correct. Indicates radiation in PAB

Technical Reference(s): E-0 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5602 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	033 AA2.10	
	Importance Rating		3.8

Ability to determine and interpret the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: Tech Spec limits if both IR channels have failed.

Proposed Question: SRO 97

Given the following conditions:

- Plant startup is in progress.
- Reactor Power is 6%
- The team is responding to a failure of Intermediate Range Channel N-35
- As Channel N-35 is being taken out of service, channel N-36 fails off-scale low

Which ONE (1) of the following actions is required by Technical Specifications?

A. Immediately raise power above the P-10 setpoint. Do not reduce power to less than the P-10 setpoint until 1 Intermediate Range channel is operable.

B. Maintain reactor power between the P-6 and P-10 setpoints until at least 1 Intermediate Range channel is declared operable.

C. Immediately suspend all positive reactivity additions and reduce power to below the P-6 setpoint within 2 hours.

D. Immediately reduce power to below the P-6 setpoint and be in Mode 3 with reactor trip breakers open within 4 hours

Proposed Answer: C

Explanation (Optional):

A. Incorrect. Although not required above P-10, not allowed to raise power

B. Incorrect. Must reduce power

C. Correct

D. Incorrect. Action is immediate

Technical Reference(s): TS 3.3.1 Function F (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 0814 (As available)

Question Source: Bank #
Modified Bank # (Note changes or attach parent)
New X

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:
10CFR55.43(b) item 2 because the SRO must apply TS for failed instrumentation channel

S97 JP3

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	------------NOTE------------ The inoperable channel may be bypassed for up to 8 hours for surveillance testing of other channels. ----------------------------	
	E.1 Place channel in trip.	6 hours
	<u>OR</u>	
	E.2 Be in MODE 3.	12 hours
F. Required Intermediate Range Neutron Flux channel inoperable.	F.1 Suspend operations involving positive reactivity additions.	Immediately
	<u>AND</u>	
	F.2 Reduce THERMAL POWER to < P-6.	2 hours
G. Required Source Range Neutron Flux channel inoperable.	G.1 Open Reactor Trip Breakers (RTBs).	Immediately

(continued)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	E02 EA2.2	
	Importance Rating	3.0	

Ability to determine and interpret the following as they apply to the (Reactor Trip Recovery): Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

Proposed Question: RO 98

Given the following conditions:

- A Steam Line Break has occurred.
- All equipment actuated as required.
- The team has isolated the faulted steam generator.
- Safety Injection, Containment Isolation Phase A, and Containment Isolation Phase B have been reset.
- RCS pressure is 1775 psig and rising slowly.
- There are **no** other indications of RCS leakage.

Which ONE (1) of the following describes the sequence of steps that will stop SI pumps?

A. Establish Charging
Stop SI and RHR pumps
Verify SI flow not required

B. Stop 1 SI pump
Check RCS pressure stable and establish Charging
Stop 1 RHR pump. Ensure RCS pressure remains stable, then stop the second RHR pump

C. Establish Charging
Check RCS pressure stable and stop 1 SI pump
Verify SI flow not required and stop BOTH RHR pumps

D. Establish Charging
Check RCS pressure stable and stop 1 SI pump
Stop 1 RHR pump. Ensure RCS pressure remains stable, then stop the second RHR pump

Proposed Answer: A

Explanation (Optional):

A. Correct. Charging established, all pumps stopped, verification after
B. Incorrect. Describes part of an SI flow reduction sequence
C. Incorrect. Flow reduction sequence out of order
D. Incorrect. Flow reduction sequence out of order

Technical Reference(s): E-1, ES-1.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5598 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge X
Comprehension or Analysis

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
11.	<u>DETERMINE If Charging Flow Has Been Established:</u>	
	a. CHECK charging pump suction valves - BOTH ENERGIZED AND ONE VALVE OPEN • CH-LCV-112B <u>OR</u> • CH-LCV-112C	a. PERFORM the following: 1) OPEN CH-LCV-112B and CLOSE CH-LCV-112C. 2) <u>IF</u> unable to open CH-LCV-112B, <u>THEN</u> DISPATCH NPO to perform the following: a) OPEN CH-288, RWST To Charging Pumps Suction Isolation. (32 Charging Pump Cell) b) <u>WHEN</u> CH-288 open, <u>THEN</u> CLOSE CH-LCV-112C, VCT Outlet.
	b. CHECK CH-AOV-204B, Normal Charging Isolation - OPEN	b. PERFORM the following: 1) OPEN CH-AOV-204B. 2) <u>IF</u> unable to open CH-AOV-204B, <u>THEN</u> OPEN CH-AOV-204A, Alternate Charging Isolation.

(STEP 11 CONTINUED ON NEXT PAGE)

R98

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	<u>STOP SI Pumps And PLACE In AUTO:</u> • RHR pumps • HHSI pumps	
5.	<u>CLOSE The Following Valves:</u> • 822A, RHR Hx CCW Shutoff Valve • 822B, RHR Hx CCW Shutoff Valve	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

9. * VERIFY SI Flow NOT Required: *

a. CHECK RCS subcooling based on qualified core exit TCs - GREATER THAN 40°F [SEE TABLE BELOW]

RCS PRESSURE	RCS SUBCOOLING
>1900 psig	[63°F]
>1000 psig	[78°F]
≤1000 psig	[112°F]

a. PERFORM the following:

1) Manually START SI pumps as required.

2) GO To E-1, LOSS OF REACTOR OR SECONDARY COOLANT.

b. CHECK PRZR level - GREATER THAN 14% [32%]

b. PERFORM the following:

1) CONTROL charging speed to maintain PRZR level.

2) IF PRZR level can NOT be maintained, THEN PERFORM the following:

a) Manually START SI pumps as required.

b) GO To E-1, LOSS OF REACTOR OR SECONDARY COOLANT.

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	037 G2.2.22	
	Importance Rating		4.1

Equipment Control: Knowledge of limiting conditions for operations and safety limits.

Proposed Question: SRO 98

Given the following conditions:

- A plant startup is in progress.
- The latest RCS leak rate data indicates the following:
  - 0.98 UNIDENTIFIED leakage to Containment atmosphere
  - 2.4 gpm total Pressure Isolation Valve leakage. The maximum leakage from one valve is 0.39 gpm.
  - 31 SG - 0.091 gpm
  - 32 SG - 0.098 gpm
  - 33 SG - 0.118 gpm
  - 34 SG - 0.338 gpm

Using the attached Technical Specification reference, which ONE of the following leakage limits, if any, is being exceeded?

A. Unidentified

B. Primary-to-Secondary

C. Pressure Isolation Valve

D. All leakage is less than Technical Specification limits

Proposed Answer: B

Explanation (Optional):

A. Incorrect. Unidentified leakage limit is 1 gpm.

B. Correct. 34 SG leakage is greater than 432 gpd (.338 gpm)

C. Incorrect. PIV leakage is 5 gpm. Action starts at 0.5 gpm per inch of diameter. At this leakage, no valve exceeds that amount.

D. Incorrect. 34 SG is above the leakage limit.

Technical Reference(s): T.S. 3.4.13 (Attach if not previously provided)
T.S. 3.4.14

Proposed References to be provided to applicants during examination: T.S. 3.4.13 & 3.4.14

Learning Objective: No specific objective available (As available)

Question Source: Bank #
Modified Bank # X (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41
55.43 X

Comments:
10CFR55.43(b) item 2 because the SRO must know TS entry conditions for RCS leakage

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.14 RCS Pressure Isolation Valve (PIV) Leakage

LCO 3.4.14 Leakage from each RCS PIV shall be within limit;

AND

The RHR System autoclosure interlocks (ACI) and open permissive interlocks (OPI) shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4, except for leakage limits for valves in the residual heat removal (RHR) flow path when in, or during the transition to or from, the RHR mode of operation.

ACTIONS

------------------------------------ NOTES ------------------------------------

1. Separate Condition entry is allowed for each flow path.

2. Separate Condition entry is allowed for each ACI and OPI.

3. Enter applicable Conditions and Required Actions for systems made inoperable by an inoperable PIV.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more flow paths with leakage from one or more RCS PIVs not within limit.	-------------NOTE------------- Each valve used to satisfy Required Action A.1 and Required Action A.2 must have been verified to meet SR 3.4.14.1 and be in the reactor coolant pressure boundary or the high pressure portion of the system. ------------------------------	(continued)

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. 1 gpm unidentified LEAKAGE;

c. 10 gpm identified LEAKAGE;

d. 1 gpm total primary to secondary LEAKAGE through all steam generators (SGs); and

e. 432 gallons per day primary to secondary LEAKAGE through any one SG.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> Pressure boundary LEAKAGE exists.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 5.	6 hours 36 hours

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AB

3.4 REACTOR COOLANT SYSTEM (RCS)

3.4.13 RCS Operational LEAKAGE

LCO 3.4.13 RCS operational LEAKAGE shall be limited to:

a. No pressure boundary LEAKAGE;

b. 1 gpm unidentified LEAKAGE;

c. 10 gpm identified LEAKAGE;

d. 1 gpm total primary to secondary LEAKAGE through all steam generators (SGs); and

e. 432 gallons per day primary to secondary LEAKAGE through any one SG.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. RCS LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE.	A.1 Reduce LEAKAGE to within limits.	4 hours
B. Required Action and associated Completion Time of Condition A not met. <u>OR</u> Pressure boundary LEAKAGE exists.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 5.	6 hours 36 hours

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	058 AK3.02	
	Importance Rating	4.0	

Knowledge of the reasons for the following responses as they apply to the Loss of DC Power: Actions contained in EOP for loss of DC power.

Proposed Question: RO 99

On a loss of a DC bus the operator is directed by ONOP-EL-5, "Loss of a DC Bus", to locally trip generator breakers 1 and 3 if a unit trip has occurred and the generator breakers 1 and 3 have not tripped.

Which of the following is the overriding concern?

A. Excessive battery discharge

B. Motorizing the Main Generator

C. Reverse power in the Main Transformer

D. Unit Auxiliary Transformer damage

Proposed Answer: B

Explanation (Optional):

A. Incorrect. If DC bus is lost, not worried about battery
B. Correct. Breakers must be opened to disconnect from grid
C. Incorrect. Main transformer can send power either way. It is not a generator
D. Incorrect. UAT will not be damaged by being connected, not a generator

Technical Reference(s): ONOP-EL-5 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 2513 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History:

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #	E11 EK1.2	
	Importance Rating		4.1

Knowledge of the operational implications of the following concepts as they apply to the (Loss of Emergency Coolant Recirculation): Normal, abnormal and emergency operating procedures associated with (Loss of Emergency Coolant Recirculation).

Proposed Question: SRO 99

Given the following conditions:

- A LOCA has occurred.
- While performing E-1, Loss of Reactor Coolant, all SI Recirculation pumps and RHR pumps are UNAVAILABLE.
- The crew enters ECA-1.1, Loss of Emergency Coolant Recirculation.
- A cooldown has been initiated as directed in ECA-1.1.

Based on current plant conditions, which ONE (1) of the following conditions requires transition from ECA-1.1?

A. An ORANGE condition on the Core Cooling CSF Status Tree

B. Makeup to RWST is initiated and level in RWST is rising.

C. RVLIS Full Range reads greater than 61%.

D. RCPs have been started and CET's are lowering.

Proposed Answer: A

Explanation (Optional):

A is correct. Although ES-1.3 has instructions not to implement FRPs ECA-1.1 lifts the restriction. RED and orange path procedures are required to be implemented.

B,C,D are all incorrect. They are actions or action initiating but do not result in transition out of ECA-1.1.

Technical Reference(s): ECA-1.1 (Attach if not previously provided)
EOP Users Guide

Proposed References to be provided to applicants during examination: None

Learning Objective: 5605 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank Previous NRC

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	1	
	Group #	2	
	K/A #	E05 G2.4.6	
	Importance Rating	3.1	

Emergency Procedures/Plan: Knowledge of symptom based EOP mitigation strategies.

Proposed Question: RO 100

A reactor trip has occurred due to a loss of feedwater.

The following conditions exist:

- The team has entered FR-H.1, Response To Loss of Secondary Heat Sink.
- RCS pressure is 2240 psig.
- SG pressure is 1040 psig.
- SG levels are 65% wide range and slowly trending down.
- Total AFW flow is 0 gpm.

Which ONE (1) of the following actions is performed next?

A. Attempt to establish AFW flow.

B. Trip RCPs and establish bleed and feed cooling of the RCS.

C. Return to E-1, Loss Of Reactor Or Secondary Coolant for the LOCA in progress.

D. Depressurize SG's and initiate feed using the condensate pumps.

Proposed Answer: A

Explanation (Optional):

A. Correct.

B. Incorrect. Action only required if average of 3 lowest SG WR levels are less than 25%

C. Incorrect. No LOCA indicated. RCS pressure is greater than SG pressures.

D. Incorrect. Action may be taken if AFW cannot be restarted and MFW cannot be started.

Technical Reference(s): FR-H.1 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 3674 (As available)

Question Source: Bank # X
Modified Bank # (Note changes or attach parent)
New

Question History: Vendor Bank, Previous NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 X
55.43

Comments:

R100

Number:	Title:	Revision Number:
FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	16

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

CAUTION

- IF TOTAL FEEDFLOW IS LESS THAN 365 GPM DUE TO OPERATOR ACTION, THIS PROCEDURE SHOULD NOT BE PERFORMED.
- FEEDFLOW SHOULD NOT BE REESTABLISHED TO ANY FAULTED SG IF A NON-FAULTED SG IS AVAILABLE.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	DETERMINE If Secondary Heat Sink Is Required:	
	a. CHECK RCS pressure - GREATER THAN ANY NON-FAULTED SG PRESSURE	a. RETURN To Procedure and Step in effect.
	b. CHECK RCS hot leg temperatures - ANY GREATER THAN 350°F	b. PERFORM the following: 1) TRY to place RHR cooling in service while continuing with this procedure: • REFER TO SOP-RHR-1, RESIDUAL HEAT REMOVAL SYSTEM. 2) WHEN RCS temperature is stable or decreasing on RHR cooling, THEN RETURN To Procedure and Step in effect.

R/O

Number:	Title:	Revision Number:
FR-H.1	RESPONSE TO LOSS OF SECONDARY HEAT SINK	16

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	**PREPARE To Establish AFW Flow:**	
	a. CHECK SG blowdown: • SG blowdown isolation valves - CLOSED • SG sample isolation valves - CLOSED	a. Manually CLOSE valve(s).
	b. CHECK CST level - GREATER THAN 3.0 FEET	b. PERFORM the following: 1) VERIFY city water pressure. 2) OPEN ABFP City Water Makeup Valves: (SCF) • CT-PCV-1187 • CT-PCV-1188 • CT-PCV-1189 3) IF city water is available, THEN GO To Step 3.

(STEP 2 CONTINUED ON NEXT PAGE)

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #		1
	Group #		3
	K/A #	036 G2.2.28	
	Importance Rating		3.5

Equipment Control: Knowledge of new and spent fuel movement procedures.

Proposed Question: SRO 100

Given the following conditions:

- Plant is refueling
- Transfer Tube gate valve is open
- An irradiated assembly is in the RCC change fixture

The following occurs:

- Reactor Pit sump pump indicates ON
- High Level Reactor Pit alarm annunciates
- Containment and Recirculation sump levels are rising slowly
- R-2 and R-7 are in alarm and indications are rising

Which ONE (1) of the following actions is required in accordance with ONOP-RP-3?

Place the irradiated fuel assembly...

A. in the upender in a vertical position

B. directly west of the RCCA change fixture and unlatch the fuel from the crane

C. in any accessible spent fuel pit location

D. in any accessible core location

Proposed Answer: D

Explanation (Optional):

A. Incorrect. Losing cavity level, do not place in upender

B. Incorrect. No place to put assembly there

C. Incorrect. SFP not option

D. Correct.

Technical Reference(s): ONOP-RP-3 (Attach if not previously provided)

Proposed References to be provided to applicants during examination: NONE

Learning Objective: 5489 (As available)

Question Source: Bank # X
Modified Bank # ______ (Note changes or attach parent)
New ______

Question History: Facility Bank Previous NRC Exam

Question Cognitive Level: Memory or Fundamental Knowledge ______
Comprehension or Analysis X

10 CFR Part 55 Content: 55.41 ______
55.43 X

Comments:
10CFR55.43(b) item 5, 6 and 7 for refueling procedures and equipment, particularly accidents

S100

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NOTE

- Depending on the location of any irradiated fuel assembly in transit, the operator should proceed to the applicable section of this procedure
- Annunciation of the "High Level Reactor Pit" alarm is a positive indication of a cavity seal or nozzle dam failure
- The locations listed for fuel assembly placement are listed in preferential order, however, the final decision for placement should be based on:
  - Rate of decrease of the refueling cavity water level and the source of the leakage.
  - Location of fuel assembly in transit.
  - Available locations for placement.
  - Possibility of having multiple fuel assemblies in transit and their locations.

5.2. **Irradiated Fuel Assembly Suspended By The Manipulator Crane**

5.2.1. Place the irradiated fuel assembly into any accessible core location.

5.2.1.1. Unlatch the assembly and raise the mast clear of the fuel.

OR

5.2.2. IF the upender is available, THEN place the irradiated fuel assembly into the upender.

5.2.2.1. Unlatch the assembly and raise the mast until the "gripper up disengaged" light is illuminated.

5.2.2.2. Lower the upender to its horizontal position.

OR

5.2.3. Place the irradiated fuel assembly directly west of the RCC change fixture beside the tracks in the transfer canal.

5.2.3.1. Lower the fuel assembly until it just touches the floor ("slack cable" light illuminated). Do not unlatch the fuel assembly from the crane.